

CHAPTER VII

DEVELOPING INNOVATIVE SQM-ME DEVICES

This chapter utilizes the generic product development process, which was developed by Ulrich (2005). The process consists of six phases, which are (1) planning (2) concept development (3) system level design (4) detail design (5) testing and refinement and (6) product ramp-up.

7.1 NEW PRODUCT DEVELOPMENT PROCESS

After comparing four common NPD process in Chapter 3, the result shows that Ulrich and Eppinger's model is a suitable model for this study because this method contains 6 stages that cover all important steps with reasonable time, cost and resource requirement. They suggest marketing exploration, design, and manufacturing as the essential functions on NPD. In addition, this method is considered as the generic process for new product development. Figure 7.1 is the new product development process proposed by Ulrich and Eppinger's (2004). The SQM-ME begins with a market opportunity and selects appropriate technologies to meet customer needs. The planning activities are mainly based on the assessment of secondary data. The output of the planning phase is the project mission statement. In phase one, concept development, the needs of the target are identified. Next, the system level design provides a geometric layout of the product, and a functional specification. In the detail design, the complete specification of the geometry, materials, and tolerances of all of the unique parts will be designed. The testing and refinement phase involves the evaluation of preproduction versions of the products. The final stage is the production ramp-up phase, which is excluded in this study.

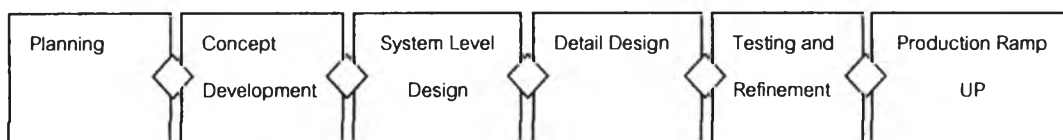
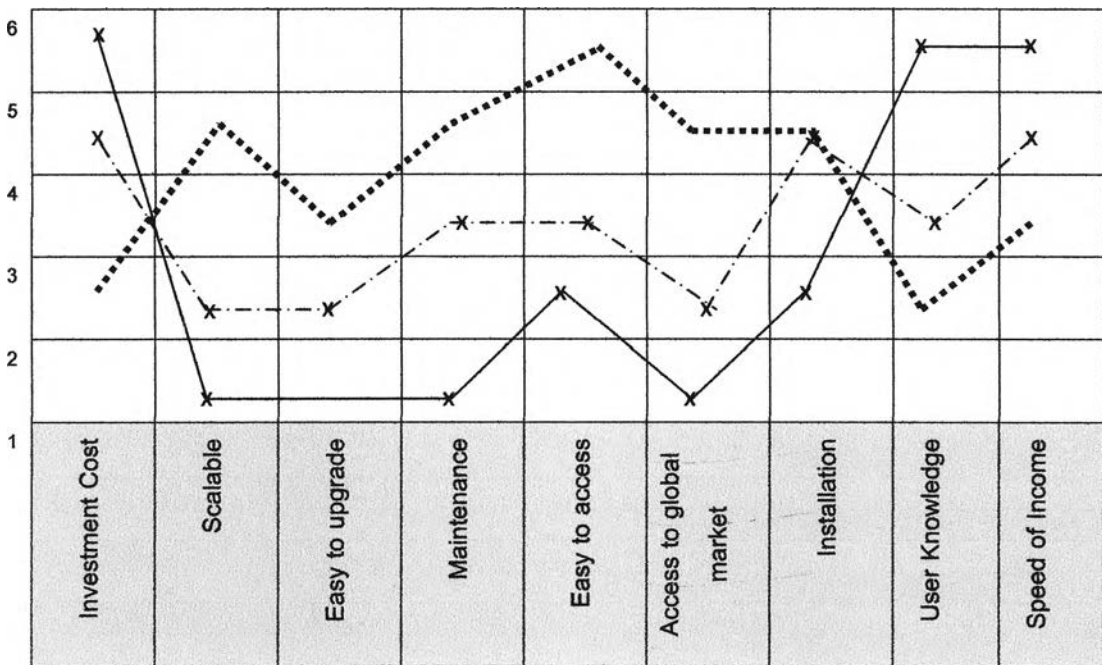


Figure 7.1 Generic Product Development Process

7.2 NEW PRODUCT PLANNING

7.2.1 Strategic Canvas

The value curve is the basic component of the strategy canvas. It is a graphic depiction of a company's relative performance across its industry's factors of competition. Figure 7.2 illustrates the strategic canvas of the SaaS comparing with traditional software and traditional customer survey. The result shows that the traditional customer survey is the common method of measuring SQ but the investment cost is high comparing to other methods. Traditional software is usually designed for specific requirement. The investment cost for developing SQM software is high. Customers have to manage the program themselves. The software requires various specifications. Customers have to pay for upgrade fee and version control.



- SaaS-Software as a service
- . - . Traditional software
- _____ Traditional Customer satisfaction Survey

Figure 7.2 Strategic Canvas

The result can be summarized that SQM-ME system on cloud computing has a good opportunity for commercialization. The initial investment is not high compared with others. In addition, this system can be expanded to international markets because the ability of SaaS allows customers from everywhere to access the system via the internet.

7.2.2 Market Opportunity

In Thailand, the mobile service industry consists of 3 main mobile operators, which occupy more than 97% of mobile service revenues in total. The key mobile operators consist of Advanced Info Service (AIS), which remains the market leader in terms of subscriber market shares and revenues, Total access communication (DTAC), which is the second and TrueMove has been the third respectively (AIS Annual Report, 2009). To response the sophisticated environment, service quality (SQ) seems to be a key driver of business success especially in the market saturation stage. Boike (2005) suggested that a firm cannot gain the competitive advantage in today's business environment without delivering high quality service. According to AIS annual report (2008), AIS paid the attention to SQ and raise the concept of lifestyle services that offer customers a delightful experience by well-trained experts who truly understand customer needs and tailor the personalize privileges and activities for customers. According to DTAC annual report (2008), satisfying customer is a crucial part of DTAC strategy under the theme "Elegant Service". The company introduces various innovations in service encounter such as one-stop service, Value added service (VAS) corner, Self Service Kiosk, and Innovative queuing system called "Queue Plus". Koobgrabe (2008) revealed that the quality of service is also the essential strategy at TRUE. Various service quality improvement campaigns and development programs are implemented to ensure the improvement of SQ. In addition, the strategy vision of TRUE reveals that quality of products and services are the main direction of the company (www.truecorp.co.th, 14 February 2010). However, Carlon (2005) stated that you cannot improve it, if you cannot measure it. Thus the firms need to find effective methods to measure the level of SQ.

To measure service quality, mobile service providers need the SQM system that will be able to measure existing SQ in mobile service shop. This is the real opportunity. The annual productivity value of the software industry in Thailand has increased over the past few years. It reveals growth rates in the software sector compared to other sectors in the Thai IT and software industry. Statistically, Thailand exports 32 million USD worth of software per year. In 2008, Thailand gained 23 percent growth in software development and Thailand has been considered as home of software companies for more than 30 years. The software industry does not meet the domestic demand. Consequently, the software imports account for approximately 70 percent of the country's total software products. As a result, there is the opportunity for Thai software developer to create the software for Thai market.

7.2.3 Cloud Computing Trend

Over the past few years, cloud computing has been gaining market acceptance. Software as a service means that a software vendor hosts a software application where customers access the software system and data via the internet. Smaller companies which have limited financial sources and have technology constraint can use SaaS model as an efficiency tool. It is also a great opportunity for SQM-ME in particular to implement the SaaS format according to its considerable opportunities (December 2007) IDC (2007).

After surveying more than 300 members of the IAMCP (International Association of Microsoft Certified Partners) including partners at an unnamed major IT distributor,

- The partnering landscape is radically impacted by SaaS 76%
- 70% view SaaS as a "big" opportunity (not a threat)
- Many business organizations involve in SaaS-related activities

- SaaS has the potential impact to the routine way in business.
- 2008 brings increased vendor participation in the SAAS space from SAP, Microsoft, Cisco Systems, IBM and others

According to McKinsey Quarterly, Delivering Software as a Service (June 2007)

- McKinsey found that SaaS is mature priority for CIOs and VCs

- Multiple factors are stimulating the growth
 - Bandwidth cost is decreased
 - Customers are frustrated with traditional software buying cycle (license + maintenance contract + upgrades)
 - The increasing of customer perception is influenced by the relationship between customers and vendors.
 - SaaS earlier success stories -- Salesforce.com, WebEx, etc. demonstrate broader value proposition.

According to Goldman Sachs (2007), SaaS is the most "impactful" trend in software

- The trend of "SaaS shift" is continuously increasing
- Over the next several years, it will be implemented in almost all areas of the software market

According to Gartner prediction 2008: SaaS Gathers Momentum reveals that

- By 2009
 - More than 40% of new business software vendors will offer a SaaS model
 - Most of 100% of Tier 1 consulting firms will have an SaaS practice
- By 2010
 - 15% of large companies will begin projects to replace their ERP with SaaS solutions.
 - 85% of SaaS vendors will offer performance SLAs in standard contracts
- By 2012
 - More than 66% of various software vendors (ISVs) will offer some of their applications as SaaS.

7.2.4 Key Drivers for SQM-ME system

In order to create the product strategy, the strategic planning session designed to come up with the result shows the drivers for developing SQM-ME system in the context of Thai mobile market. Table 7.1 shows the result from strategic planning session.

Table 7.1 Key Drivers of Technology Selection

Key Drivers	Description	Source
CUSTOMER DRIVE	Most NPD firms are almost always customer driven. If they aren't, they will quickly lose their customers. Mobile service shops now rely on the result from questionnaire, which is the passive action. Thus they need some system that provides information for active decision.	(Thailand Gateway Of ASEAN (South East Asia Hub, 2009))
COMPETITION DRIVEN	Thailand market mostly waits for someone else to develop the market before they make entry. The area of service quality is still available for developer to enter to this market because it is low priority for international investment to enter to Thai market.	Thailand Trade Department (2009)
TECHNOLOGY DRIVEN	Cloud computing is new technology that allows the developer to compete in global market with lower cost. In addition, this technology is one of the top ten technology trend of year 2010.	BOI Thailand Board of Investment (2009)
RESOURCE DRIVEN	The cost of software and system is increasingly expensive. This SQM-ME system provides its value without investment in its future. It can also pool resource for customers.	Thailand Trade Department (2009)
CULTURE DRIVEN	Thai market always utilizes the pirate software, so this is the alternative for customers to choose the legal system with lower price.	(Thailand Gateway Of ASEAN (South East Asia Hub, 2009))

7.2.5 Product Strategy

"Product strategy begins with a strategic vision that states where a company wants to go, how it will get there, and why it will be successful."

Source: (McGrath 2001)

Understanding customers and market is a critical first step of developing new product. After implementing the strategic canvas combining with technologies trends, the result from

strategic planning session proposed product strategy for SQM-ME model. Table 7.2 shows five main strategies, which are focusing on long term revenue, sales as a consultant not a salesman, allowing partner to embed the solution, customer Service Strategy, and legal strategy.

Table 7.2 Product Strategy

Opportunities/ Challenges	Product Strategy
<p>Revenue Model</p> <ul style="list-style-type: none"> - Lower short term revenue - Slower revenue growth - Slower cash inflow - Predictable, compounding revenue stream (less volatility, better ability to plan) - Higher long term revenue - Shorter ROI time scale 	<p>Focus on long term revenue.</p> <ul style="list-style-type: none"> -Lower price -Go to mass customers especially for SME -Make sure the liquidity of the company as a result of slower cash inflow.
<p>Sales and Compensation</p> <ul style="list-style-type: none"> • Sales model differs from traditional software • Sales compensation structures also differ <ul style="list-style-type: none"> - Commissions based on ongoing customer usage and revenue - Not on sale of large up-front licenses • Dealing with renewals and churn is key 	<p>Sales as a consultant not a salesman</p> <ul style="list-style-type: none"> -Able to educate customers - Commission based on customer usage - Customer Relationship need to be closer
<p>Partners and Distributors</p> <ul style="list-style-type: none"> • SaaS can require adjustments to existing partnerships • Also creates opportunities for new partnerships for <ul style="list-style-type: none"> - Application integration - Data integration - Data mining - Allowing partners to embed SaaS offerings as part of their solutions 	<p>Allowing partner to embed the solution</p> <ul style="list-style-type: none"> - SQM-ME should be able to link to customers' existing system. - Providing the opportunity for partner to embed SQM-ME to their solution
<p>Customer Service</p> <ul style="list-style-type: none"> • Assist customer to manage and monitor <ul style="list-style-type: none"> - Hosting (rather than shrink-wrapping) - Data center operations - Systems and network monitoring - Billing - Managing customer expectations 	<p>Customer Service Strategy</p> <ul style="list-style-type: none"> -Maintenance and monitoring service for hosting, data center, network, billing and customer database. -Upgrade versions online -Provide customer education and

Opportunities/ Challenges	Product Strategy
<ul style="list-style-type: none"> - Customer education • Upgrade the version of SaaS online • Continuously improve architectural, managerial, governance, procurement, etc. <ul style="list-style-type: none"> - Leveraging increased ability to collect customer feedback and data • Additional issues presented when transitioning legacy customers to SaaS (or maintaining them after others have transitioned) 	<p>knowledge</p> <ul style="list-style-type: none"> -Billing represents the cost based on usage. - SQM-ME can be adjustable to the customer requirement. - Online support system - Call Center support
<p>Legal</p> <ul style="list-style-type: none"> • Contracting model is different with SaaS <ul style="list-style-type: none"> - Driving contracts online - Dealing with mixed contracting model - Identity validation • Preparing for service levels agreements (SLAs) • Termination and migration • Security • Data privacy (and data usage) • Transition of legacy customers (for those customers that have purchased long-term contracts for updates and maintenance) 	<p>Legal Strategy</p> <ul style="list-style-type: none"> -Contract duration strategy- trial, 1 year, 3 years, etc. -Establish contracts online -Security System - Free upgrade for long term contract. - Guarantee data privacy

7.2.6 SQM-ME PROJECT MISSION STATEMENT

Expected Product Description:

The SQM-ME software provides a complete set of SQ measurement tool for mobile service shop with minimum-to-medium knowledge and skills in business planning, SQM management, measurement and benchmarking.

It helps in identification of measurable business results based on minimizing collected data activities, facilitating continuous improvement and preparation of effective decisions by simulation of outcomes. The SQM suite is a valuable component in effective innovation management, controlling SQ performance as well as achieving sustainable

business development within the enterprise of all business sizes from start-up to large companies. The SQM-ME is a cost effective software suite as a result of cloud computing technology that is unique in its combination of design concepts, underlying methodology, simplicity of operations and fast learning curve. The software has been successfully applied for improving quality, competitiveness and managerial capacity.

Key Business Goals:

1. Cost Leadership

SQM-ME eliminates the need to purchase hardware and software that must be installed, configured, upgraded and maintained internally. The on-demand subscription model bundles all of those costs into periodic payments that enable customers to avoid the upfront expenditures for technology purchases along with the associated investments in IT support staff.

2. Easy to install and maintain

SQM-ME suit on-cloud architectures allow an organization to go from technology selection to deployment as quickly as their data can be made available. In addition, lengthy projects are no longer necessary to upgrade SQM-ME software, since that is a part of cloud computing service.

3. Ease of use and User friendly

The existing traditional SQ measurement in the market is complex and difficult to use. SQM-ME requires the ease of use in the view of customers. To determine "ease of use," understand the customer and user needs firstly. To understand their needs, conduct research, iterate designs for validation, and evaluate the design for ease-of-use.

4. Real time monitoring

A real-time software solution provides a visual representation of business data. Flexible displays help managers quickly highlight problem areas. Automatic real-time updates keep business moving forward.

5. Automatic Distribute Data

Easily distribute important information with e-mail and data export options.

6. Dynamic Filtering and Search

Dynamic filtering and search features allow users to quickly locate specific data on the fly without changing their display.

Segmentation

Segmentation is fundamentally about selecting customer groups by dividing a market to distinct groups of buyers. In this case, we divided the market by using the way they perceive value. This system will be specifically designed for mobile service shops, thus three main players in the market, which are AIS, DTAC and TRUEMOVE are our main focus. However, this system is designed to be adjustable for other industry. Consequently, any industry that has the customer service shops can apply this SQM-ME system.

Primary Market

1. Mobile Service Shops (AIS, TRUEMOVE, DTAC)

Secondary Market

2. Customer Service Shops

7.3 PROCESS MAPPING

Process mapping is one of the oldest, simplest and most valuable techniques for streamlining work. Process mapping refers to activities involved in defining exactly what a business entity does.

7.3.1 Mobile Service Shop Layout

Figure 7.3 shows the layout of sample shop in order to visualize the environment of service delivery. However the detail and layout in different area can be different. As seen, once customer enters to mobile shop, customer relation staff will come to ask for the customer need. Customers who are willing to purchase any products can go directly to sale management spot. If customers aim to make a payment or after-sale service, they have to reserve the queue at queuing machine and wait for calling at waiting area. Queuing list of payment service and after-sale service are separated. Behind the service counter, there are two rooms, which are stock room and manager room. There are some televisions or VDO

wall for promoting commercial advertisement and company news. However, figure 7.3 shows the common layout only. There are some differences among mobile shops.

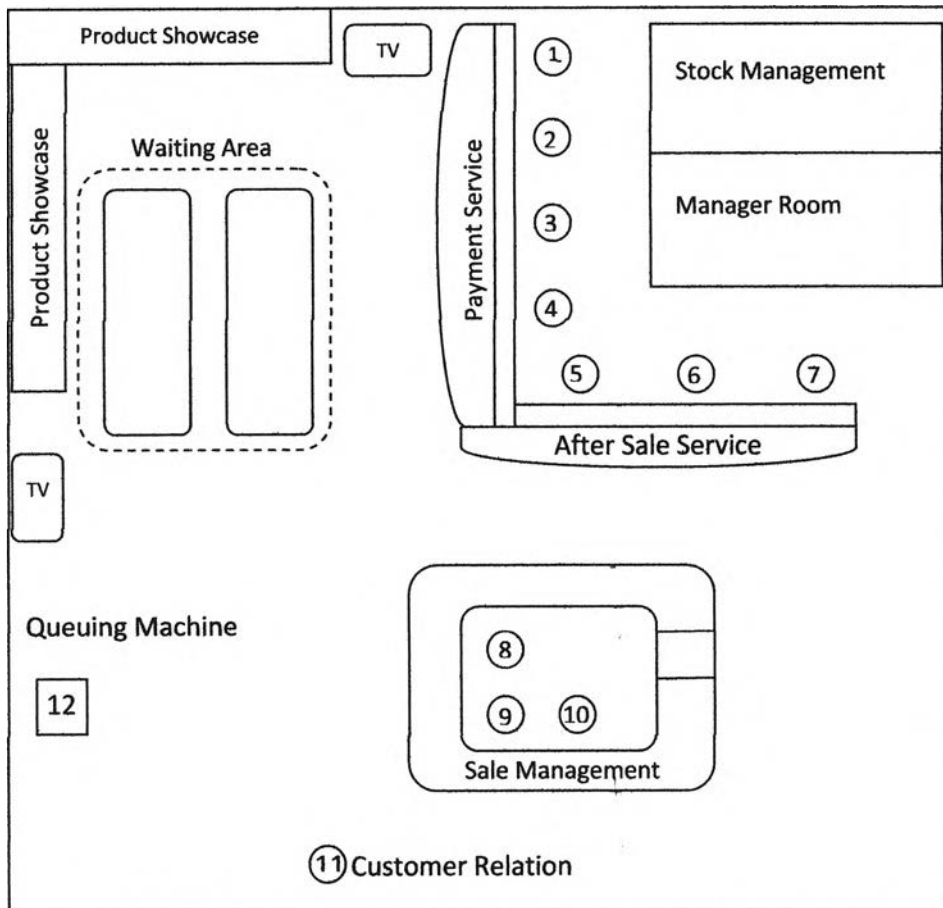


Figure 7-3 Mobile Service Shop Layout

7.3.2 Defining core processes in mobile service shop

The process mapping approach of mobile service shop is implemented in a model case, which is Truemove shop. The process mapping can be considered as the simplest ways to analyze current situation of mobile shop visually as well as to detail other parts of a process or an entire process. The key processes are grouped into two categories, which are core processes and supporting processes. The result of process mapping is identified by gathering quality data via in-depth interview. The key activities of service delivery in mobile shop contain six core processes, which are greeting process, selling product, queuing

process, bill payment, after-sale service, and satisfaction gathering process. There are four main supporting processes: shop opening & preparation, stock management, process backend and customer compliant management. The value chain of service delivery can be found in the figure 7.4.

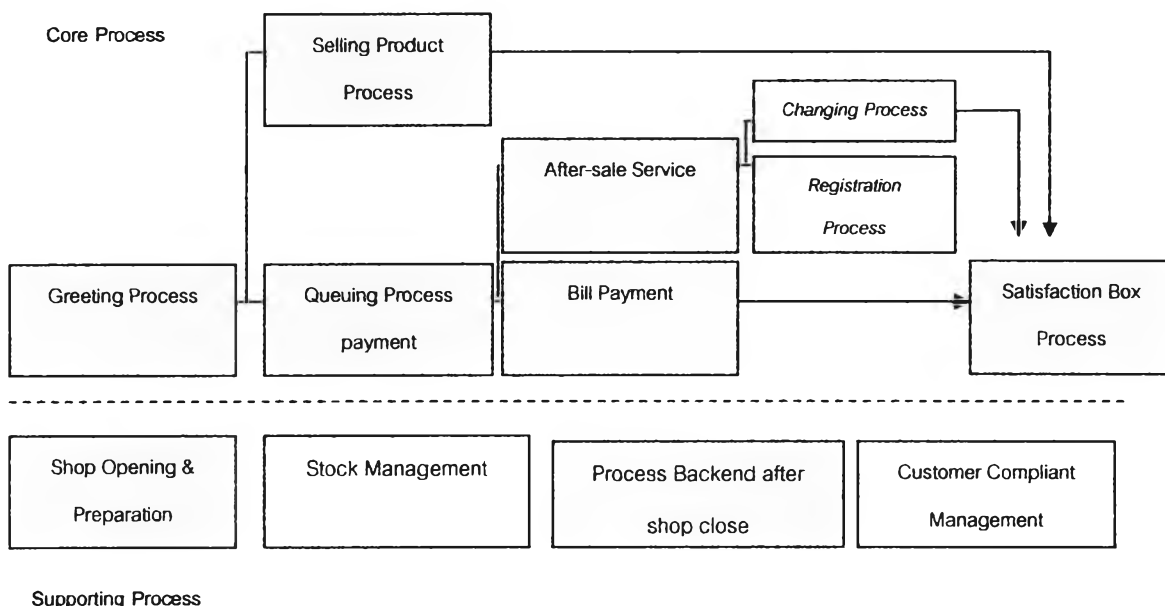


Figure 7.4 Value chain of mobile service shop

Figure 7.5 shows greeting process, which is one of the most important factors that mobile shops need to focus. Customers who enter to a mobile shop can gain first impression. When a customer enters to a mobile shop, a customer service staff has to welcome the customers, and ask for customer expectation. In case of existing customers, customer service staffs will bring customers to specific zone, which can be bill payment process, or sale process. However, if the customer is the new account for mobile shop, customer service staffs will introduce product and service in each zone.

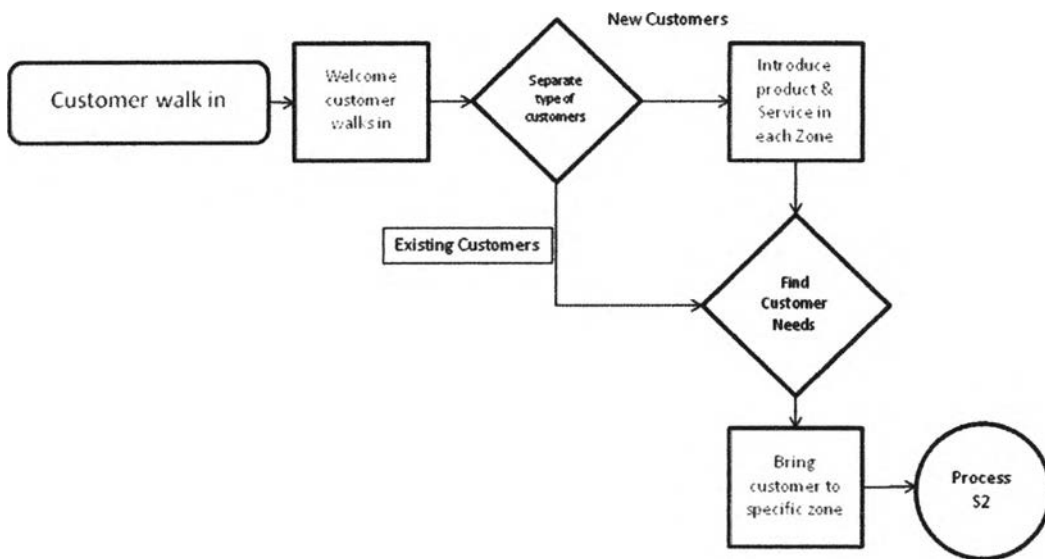


Figure 7.5 Greeting Process

Figure 7.6 shows the selling process. After separating type of customers, customers who want to purchase products, will be led to selling spot. Staffs will ask customers about what products they need (such as WI-FI, SIM card and Top up card). For this selling process, service providers have to know their products and service information, which need personal skills. Consequently, staffs in this process require product skill training.

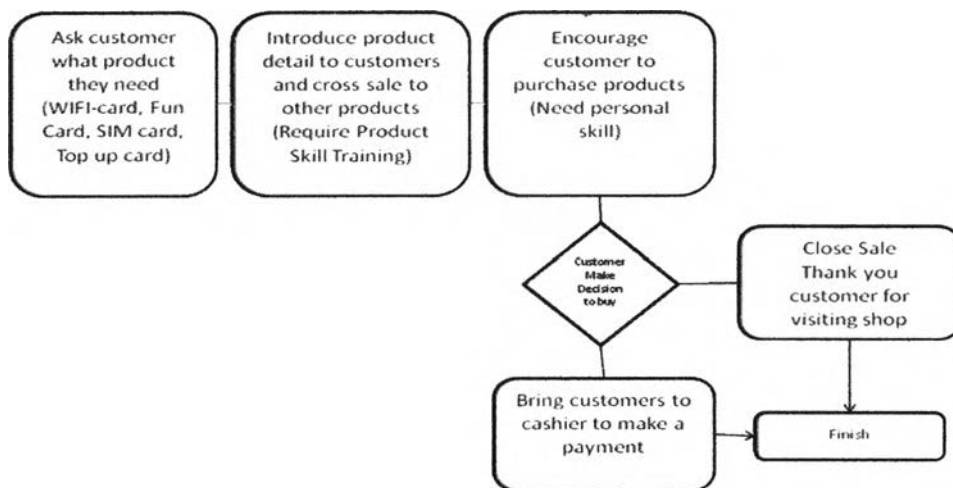


Figure 7.6 Selling Product

7.3.3 Queuing System Process

In the input process, there are two main indicators, which are average arrival rate that reveals the number of customers who enter to a mobile shop in certain time and

average arrival time that shows the duration between customer entries. In the service process, there are two indicators, which are average service rate, which shows the number of customers who are served with completed services in certain time and average service time, which reveals the average time consumption per customer. Service discipline for mobile shop is first in first out, so mobile staffs will call customers by order. In the queuing system, some overall performance can be monitored as such the capacity of customers being served per day and average number of customers per service provider.

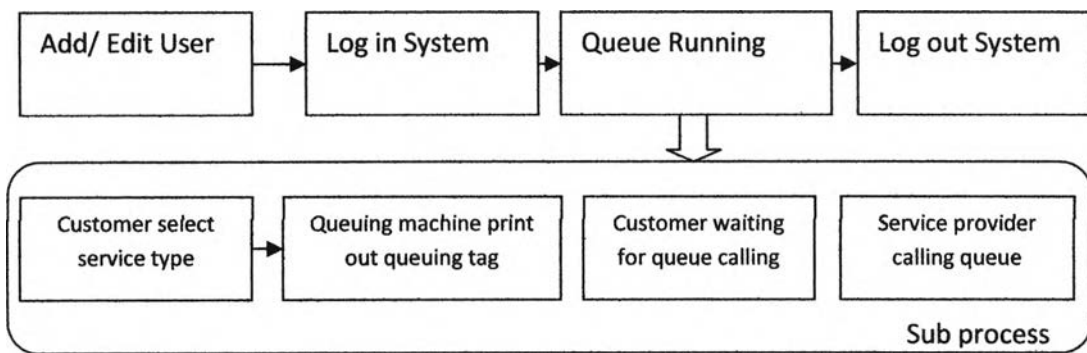


Figure 7.7 Queuing Process

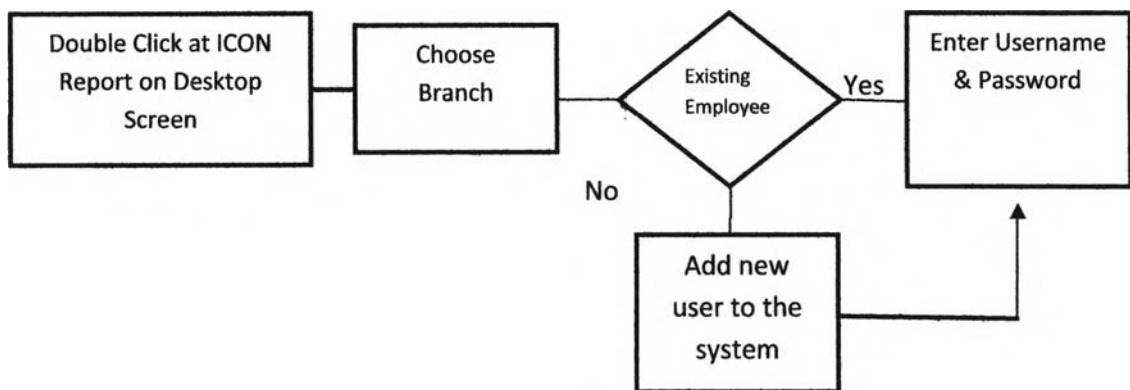


Figure 7.8 Add and edit users

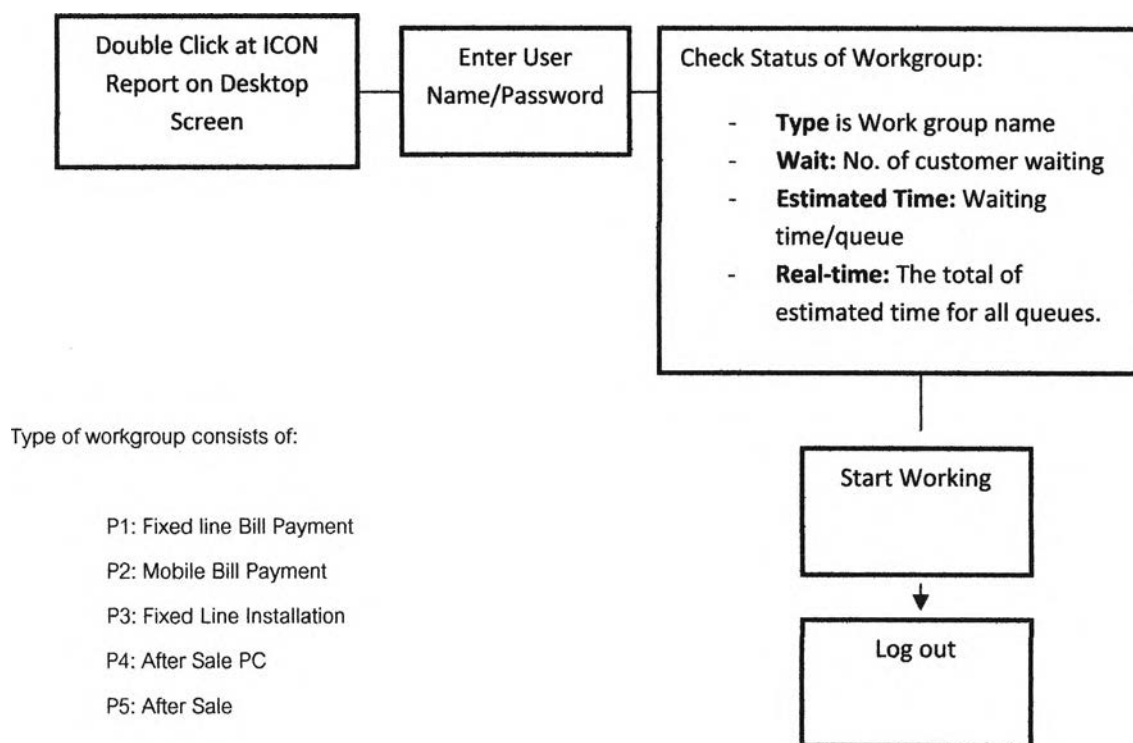


Figure 7.9 Login/Log out in Queue System

7.3.4 Satisfaction box Process

After delivering the service, a customer will press the satisfaction score into the satisfaction box (SAT box) on the service counter. Figure 7.10 shows the process of SAT box installation. Service staffs will connect SATbox with remote queuing software in each service touch point by using USB Port. After finishing service delivery, customers will press the number from 1-5. However, service providers will not know the respond from customers. The daily report will be sent from the system to service providers and management at the end of the day.

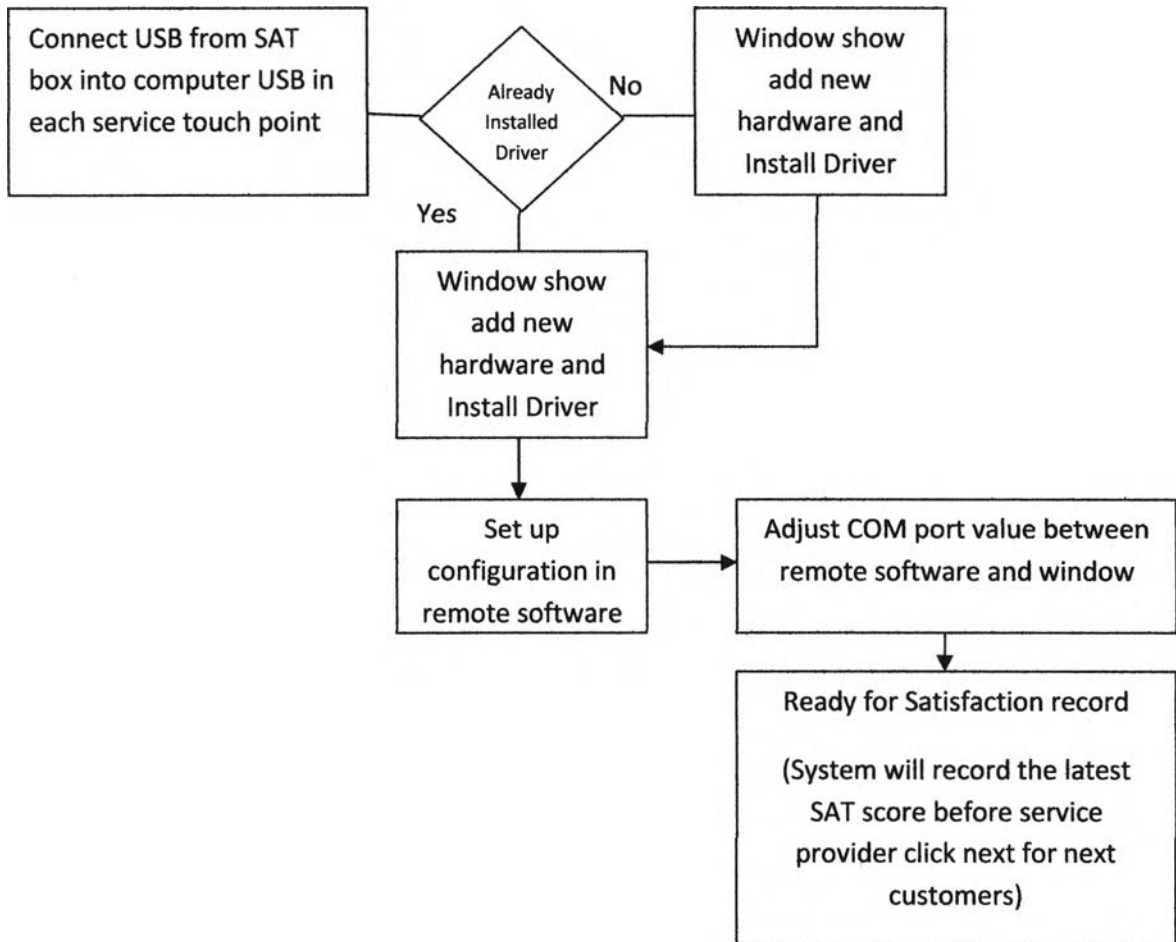


Figure 7.10 Satisfaction Box Installation (SATbox)

For supporting process, shop opening preparation in figure 7.11 is the key process. Staffs need to check the readiness of shop environment such as cleanliness, layout, documents and tidiness. In addition, a staff has to check the availability of products and services in the stock. Finally, the computer system has to be checked and solve the problem before opening a shop.

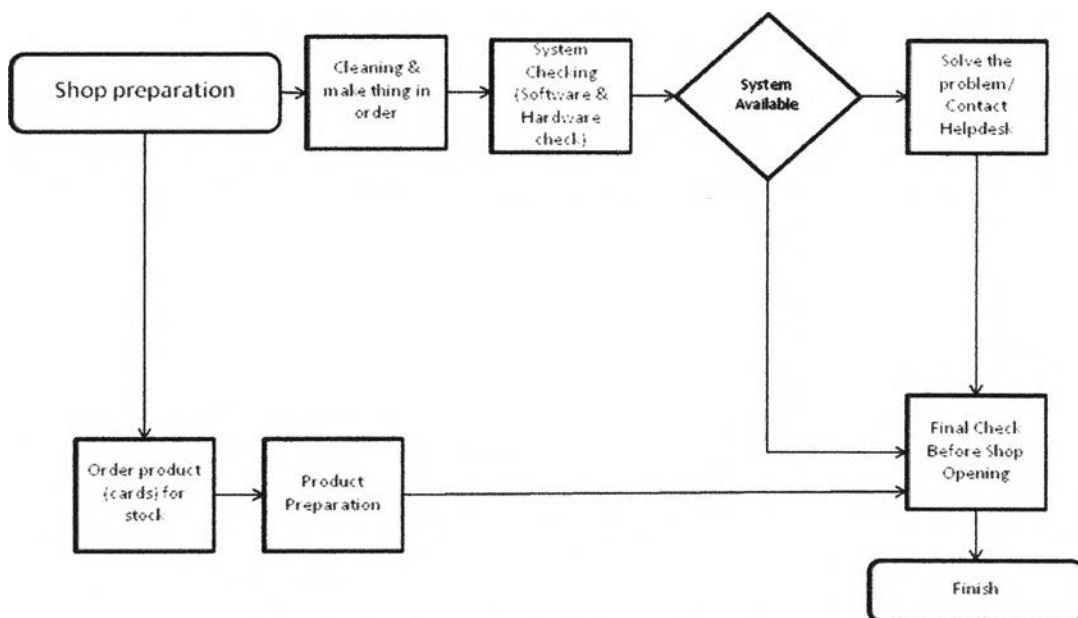


Figure 7.11 Preparation before shop opening

Figure 7.12 shows the process back-end after shop closing. Reporting system has to be closely monitored by management. A staff has to summarize daily report to a vendor and procurement. In addition, money will be delivered to security system.

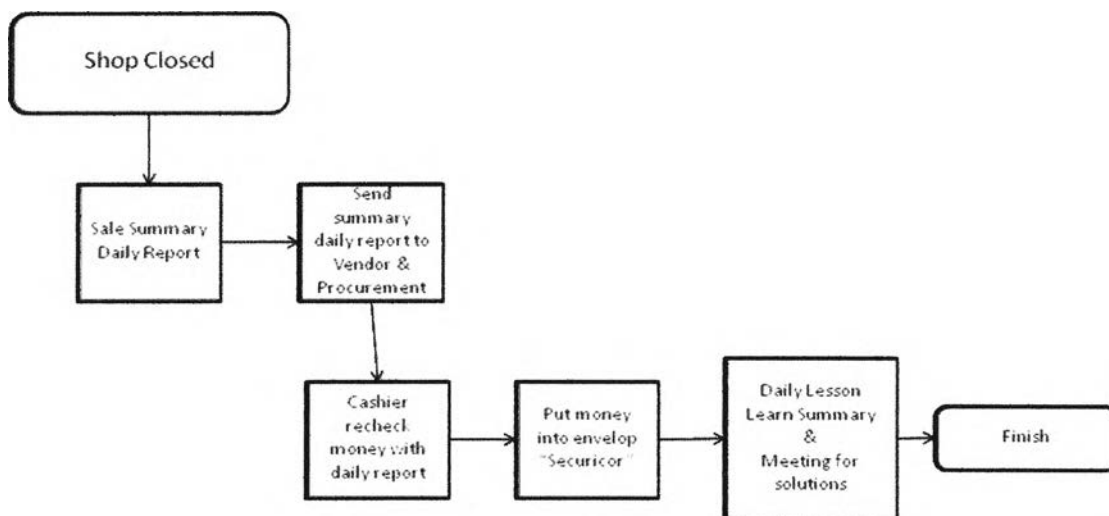


Figure 7.12 Process Back-End after shop closing

7.4 CUSTOMER NEEDS

Boike (2005) stated that understanding customers and markets and their needs had long been known as critical success factor of new product development. The linkage between market and technology lead to new product success. According to the customer

requirement session, 20 mobile service staffs from 5 different branches are considered as customers who will utilize the SQM-ME system. It seems simple enough to identify the customers; consequently, customer a in this case are the SQM-ME system's users, which are mobile telecom shop staffs. Customer needs come from field observation in a mobile shop. The customer needs survey was made during 14 March 2010. The result of the study was delivered to development team to compare the technology difficulty and financial possibility. The development team consists of 3 IT experts, 2 software engineers in the development team and the author as the project team leader

Table 7.3 A Comparison of Customer Needs Resulting from Customer Requirement Session.

Customer Needs	Technology Difficulty A (From 1(low) to 5 (high))	Financial Investment B (From 1(low) to 5 (high))	Requirement Affordability Level A*B= C
View tooltips on graphs for detailed information	1	2	2
View and add notes in reports for collaboration	1	2	2
Print and print preview	1	2	2
Lock row and column headers to provide context even deep into a report	2	2	4
Context sensitive right mouse click menus	2	2	4
Simple sorting and multiple column sorting (3 key)	2	2	4
Create shortcuts to reports and reporting objects	2	2	4
Expand all page-by fields when exporting to Microsoft® Excel	2	2	4
Browse and search reports	3	2	6
View reports in normal and full screen modes	3	2	6
Undo and redo changes in reports	2	3	6

Customer Needs	Technology Difficulty A (From 1(low) to 5 (high))	Financial Investment B (From 1(low) to 5 (high))	Requirement Affordability Level A*B= C
Turn visual indicators on and off	2	3	6
Personalize subscriptions by answering prompt questions	2	3	6
Subscribe to a report or document to be delivered to your History List	3	2	6
View reports in PDF	3	2	6
Export reports to Microsoft Excel, HTML or text formats	2	3	6
Export graphs to Microsoft® Excel as live Excel Charts	2	3	6
Flip through salient data by selecting one or more business dimensions in a report's Page By fields	3	3	9
Incremental fetch of large data sets and element browsing	3	3	9
Multiple dated versions of same subscribed report available in History List	3	3	9
User, data, and object level security	4	3	12
Change view mode between grid and graph or view as grid-and-graph	4	4	16
Format grid reports using a choice of built-in styles	4	4	16
Save personal prompt answers for reuse	4	4	16
Interact with data in detailed tabular grid reports	5	4	20
Graph data to analyze information quickly	5	4	20
Run ad hoc reports, selecting report data by answering prompts	4	5	20

Customer Needs	Technology Difficulty A (From 1(low) to 5 (high))	Financial Investment B (From 1(low) to 5 (high))	Requirement Affordability Level A*B= C
Discover data patterns and forecast using predictive analytics built with sophisticated data mining algorithms	5	5	25
Wizard driven report creation, selecting report objects by answering prompts	5	5	25
Drill down on tabular grid reports and graphs to investigate root causes	5	5	25
Linked reports and drill-to-template guide investigative workflow	5	5	25
Simultaneously run and retrieve results for multiple reports	5	5	25
Sent SQM result to mobile phone	5	5	25

*Financial investment bases on man-day utilization and system infrastructure required.

7.5 CONCEPT DEVELOPMENT

SQM-ME system is designed to move away from traditional product. It is not a single tangible product but contains the total utility created through the customer's experience of using service quality measurement system. So, the need of customers will be the requirement for the concept development session.

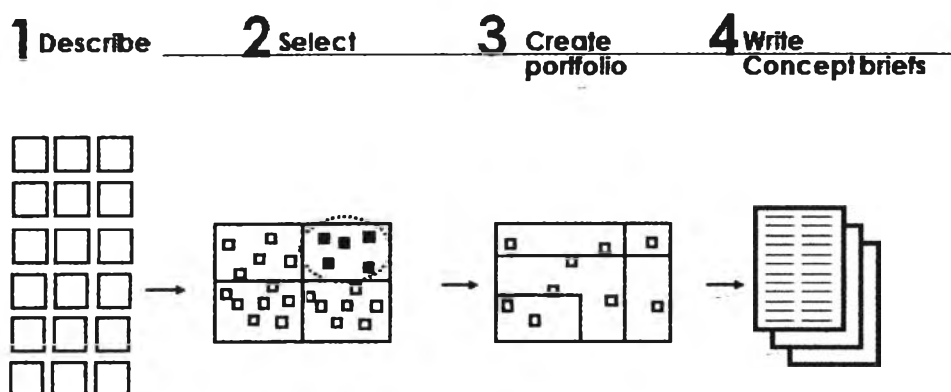


Figure 7.13 Concept Development

Firstly, the concept development session is conducted by sitting around the table of 6 people. The project leader provides the information about customer expectations and market background. The teams are granted a relatively high level of autonomy and independence in this program. The idea generation session is conducted in four rounds. The first round, the members are not allowed to have any face-to-face conversation. They have to provide input as many ideas as possible. The ideas are written into the post-it papers. Secondly, the list of ideas is classified into various groups. Some ideas are similar, so they are collected into the same group. The list of ideas can be summarized as table 7-4:

Table 7.4 Idea Classification

1. Cloud computing	2. Pay per use	3. Access via mobile
4. Online Survey	5. Alert System	6. Self software management
7. Graphic Report	8. Innovation Score	9. Compare the result with history
10. Satisfaction Box	11. Voice Recognition	12. Face Recognition
13. Text to speech	14. Automatic system	15. Telephone Survey
16. Artificial Intelligence	17. Upgrade from Center	18. English/Thai language

19. Forecast Function	20. SQ SMS Alert	21. Queuing Alert
22. SQ Improvement Tracking	23. Daily Report Setting	24. Interface Customization

After the lists of ideas are classified, the data is filled in the idea portfolio grid by comparing value to business and value to customers. The third round utilizes the consensus of product development team.

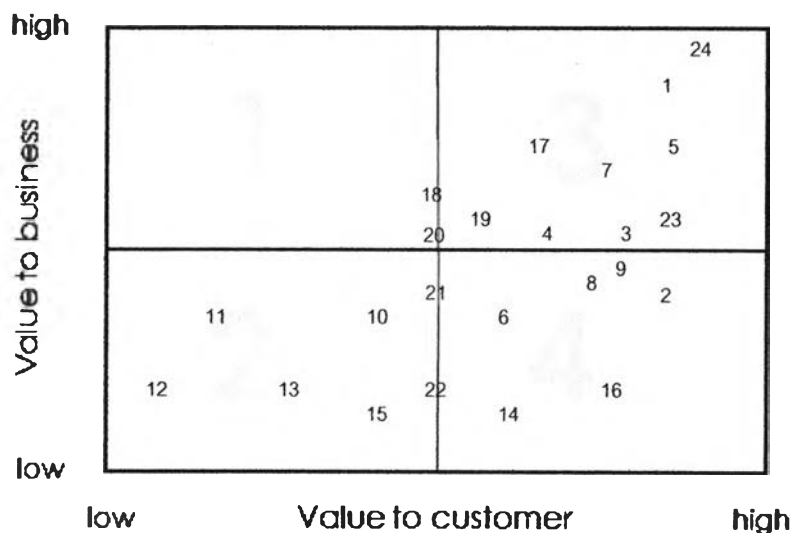


Figure 7.14 Value Diagram

According to figure 7.14, the team selected all ideas in quadrant three, which is highest value to business and customers. The selected ideas consist of software, cloud computing technology, access via mobile, online survey, alert system, graphic report, upgrade from center, Thai-Eng language, forecast function, SMS alert, daily report setting and interface customization.

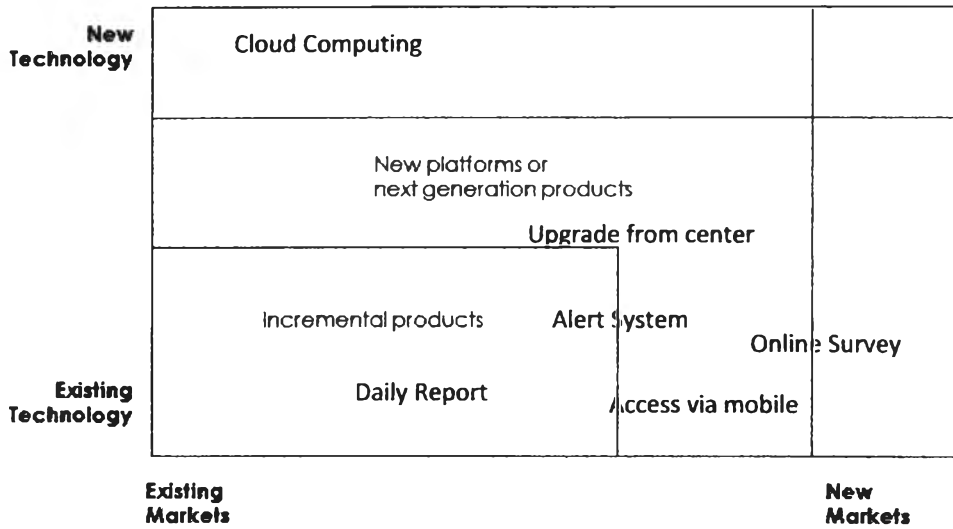


Figure 7.15 Idea portfolio

7.6 SQM-ME MESUREMENT PROCESS

According to the concept of SQM process, there are two main sensors. The data from first sensor come from the system monitoring with tangible indicators. All collected data will be delivered to database on cloud computing visual system. Consequently, several branches of service shops can compare the data and provide cross functional analysis. The result will be sent to management via mobile phone and website base.

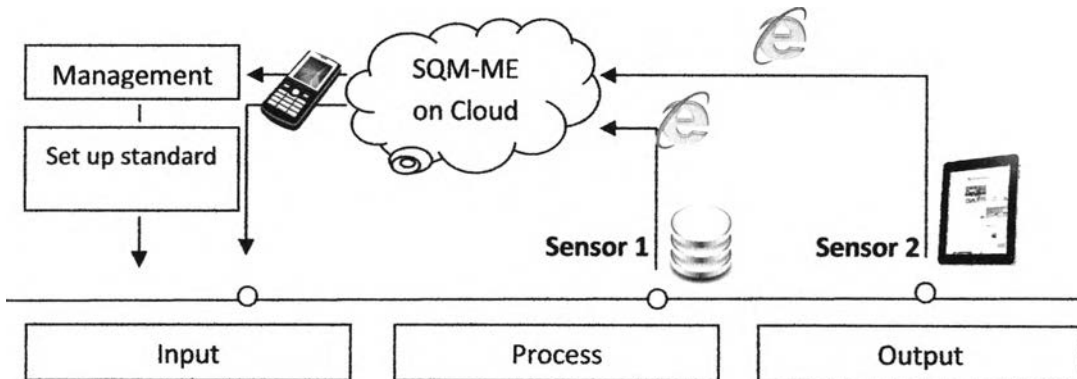


Figure 7.16 Service Measurement Process

The data from sensor 1 will be collected from database and sent via the internet to SQM-ME system on cloud computing. SQM-ME analysis will calculate the result and send the report to executives via mobile phones and websites. The result from sensor 1 represents the service performance compared with the organizational policy and standard. The sensor 2 is designed to monitor customer perception by using online survey module of SQM-ME system. Online survey can be implemented by using small computers as the input device. The structure of the survey comes from the SQM-ME model and formula. The SQM-ME result will be shown to executives via mobile phones and websites.

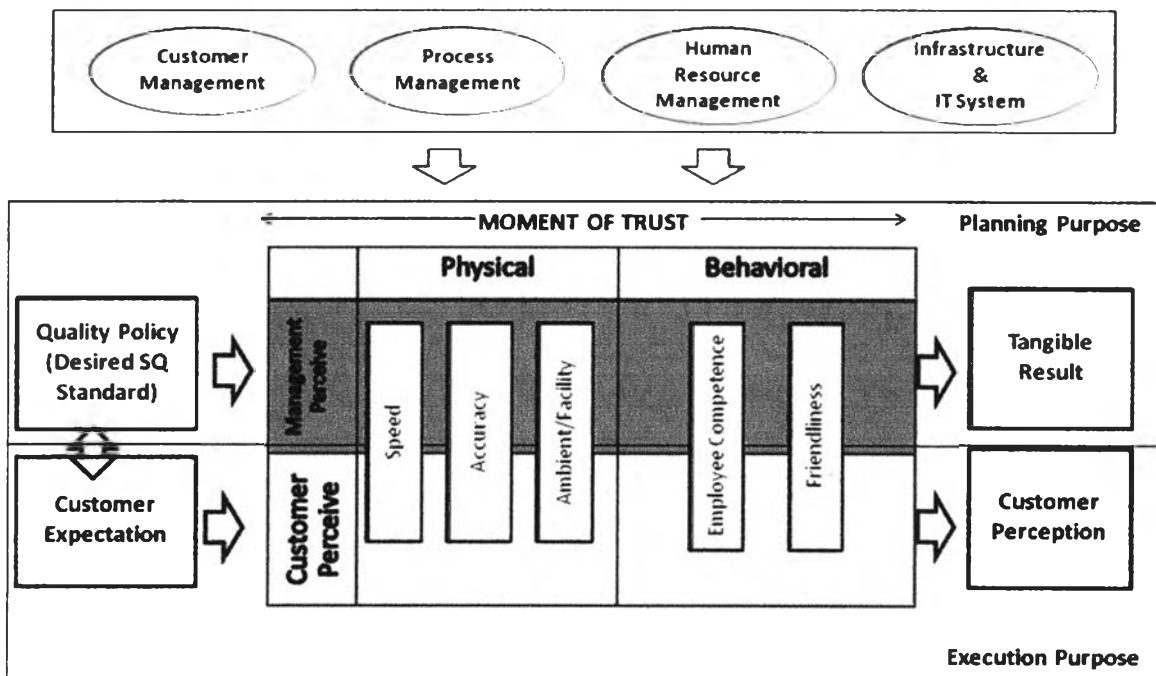


Figure 7.17 ADJUSTED SQM-ME MODEL

7.6.1 Activity Diagram

Activity diagrams can be used to describe the business and operational step-by-step workflows of components in a system. Firstly, shop simulation is created in order to visualize the mobile shop. Figure 7.18 shows the floor plan of mobile service shop. Zone one represents the queuing machine. Customers have to select the type of service at this point. There are two main services, which are billing payment and after sale service. After receiving the queue number, customers can come to zone two, which is the waiting area.

However, if customers come to shop in order to purchase some products, they can access directly to zone five. Zone three contains billing service stations for bill payment. Zone four is designed to serve customer who needs after-sale services. Zone six is the management zone that monitors the overall process.

According to figure 7.19, customers enter to mobile shops with their service expectation. It is difficult to measure what is the level of service they need to receive. In addition, customers do not want to give any information before finishing their task. According to measurement process model, the system will gather the data from queuing process and send the data to the server in cloud computing servers. The analysis will automatically calculate the service quality performance and send it to executives and managers every hour.

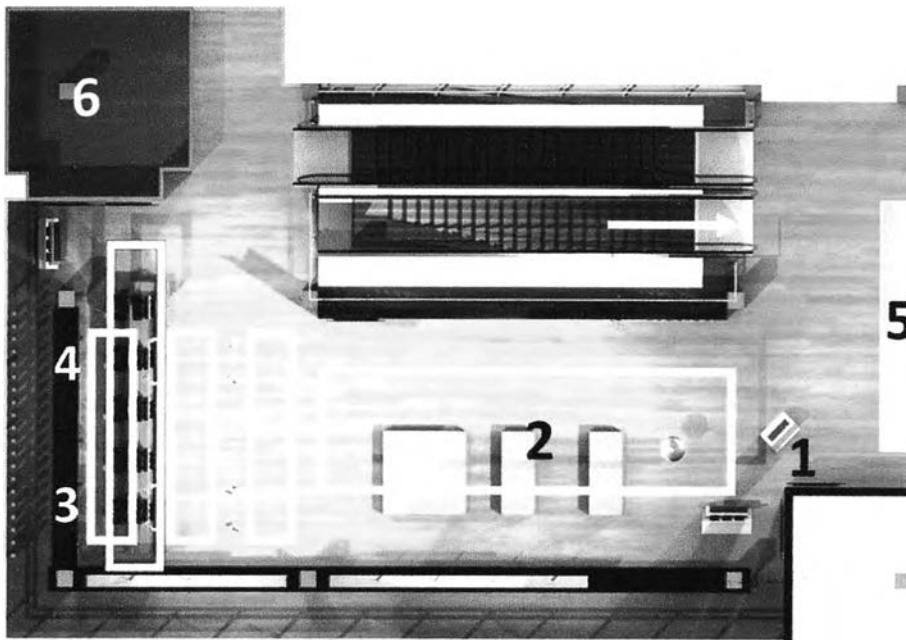


Figure 7.18 Shop Top View

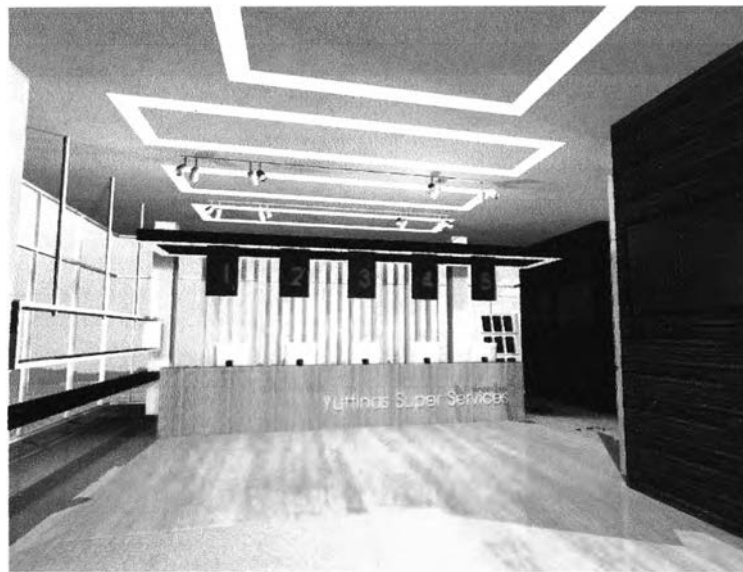









Figure 7.19 Service Counter

Activity diagrams are graphical representations of workflows of stepwise activities and actions with support new development of scenario. Table 7.5 shows the detail of SQM-ME process.

Table 7.5 Activity Diagram

Process	Activity Name	Description
	<p>A customer enters to the queuing machine. Computer system already records important data, such as selected service, customer mobile number, arrival time.</p>	<p>The information will be sent to Cloud server automatically via the internet.</p>
	<p>Type of services will be classified and separate queuing number for customers.</p>	<p>The population of customers in the shop will be calculated compared with service provider affordability by comparing the past history.</p>

Process	Activity Name	Description
	<p>After receiving the queue number, the system will start record the time until service provider call the queue.</p>	<p>Waiting time will be sent to the system. So management can monitor the average waiting period compared with standard.</p>
	<p>While Customers are waiting in the waiting area, the queue slip already shows the amount of payment, so customers can prepare money.</p>	<p>Customer who are waiting more than 5, 10, 15 minute will be treated differently by customer service staffs, based on the information from system alert. For example, if average waiting time is more than 10 minutes, there will be some water serving.</p>
	<p>Overall processes are also be monitored such as total customer per day, number of customers per service station.</p>	<p>Overall performance will be delivered to SQM-ME and represent the SQM Score.</p>
	<p>Customer who just finished the task will be asked to answer the question via iPad.</p>	<p>The information from customers after finishing service is customer perception. This information will be sent to cloud computing automatically.</p>
	<p>The result of online questionnaire model in SQM-ME will be analyzed and compared with other branches.</p>	<p>The system will record all feedback from customers. In addition, this system can collect the data every day.</p>

7.7 SYSTEM DESIGN

??Corporate objectives must define how the business is going to achieve its strategy. SQM-ME is designed to serve management and service operators in service quality measurement with user friendly interface. Cloud Computing is a major initiative of

SQM-ME system to modernize Information Technology (IT) within the mobile service shop. Cloud computing has the capability to reduce the cost of IT infrastructure using commercially available technology that is based on virtualization of servers, databases and applications to allow for capital cost savings.

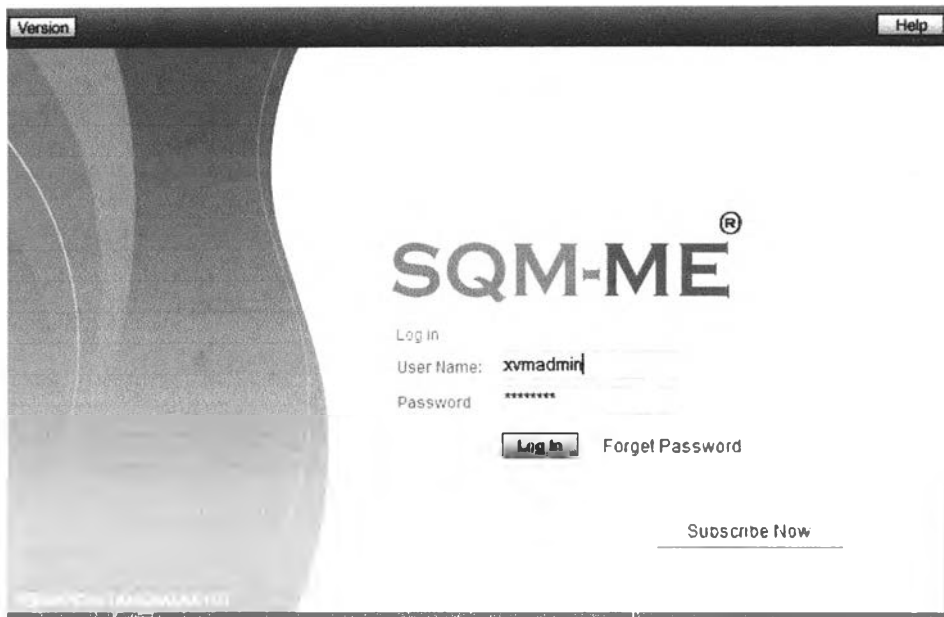


Figure 7.20 Log-in Pages

In SQM-ME system, security responsibilities are shared between the SQM-ME service providers and the customers. In most cases, an SQM-ME provider will be in charge for provisioning, securing, monitoring, and maintaining the hardware, network(s), and software that support the infrastructure that is offered. In addition the SQM-ME service provider will be responsible for the security of the Operating System (OS) and any additional software (i.e., any data base management systems), including the applications provided. If individual (named) user access is required, the specific Service Level Agreement shall document who is responsible for creating and maintaining user accounts. The Service Level Agreements shall also document how the user accounts will be created and maintained. Figure 7.20 shows the log in page, which allows users to create accounts and monitor usages. When users access the system, the SQM-ME management dash board will show the information in four main areas, which are user resources, including virtual server, hard disk and software usage information. The second category is usage billing of cloud computing both service and software utilization (SaaS). The third area is service quality

reports, which are provided by SQM-ME service providers, but they can be customized. The final area in the management dashboard is a user profile. So users can adjust and develop their personal information.

The dashboard is titled "SQM-ME" and features a navigation bar with the following links: Dashboard, Member Profile, Control Panel, Recharge Your Balance, and Billing Enquiry. The main content is organized into four primary sections:


- My resource:**
 - 2 Cloud Servers
 - 3 virtual Processors
 - 2048MB RAM
 - 0 IP Addresses
 - 100GB SASP-6 Volumes
 - 0GB SASP-11 Volumes
- My Billing:**
 - Current Balance: B 291.4700
 - Transaction History
 - Billing Report
 - Recharge by Bank Transfer
 - Recharge by Paypal
- Service Quality Reports:**
 - Service Quality Index by branch
 - Average Speed of Service
 - Average Waiting time
 - Incompleted Service Handling
 - Online Customer Survey
- My Profile:**
 - Login / Password
 - Personal Business Information
 - User Preference
 - Add new branch
 - Add security level/ Alert System

A "back to TOP" link is located at the bottom right of the dashboard area.

Figure 7.21 Dash Board

Figure 7.22 shows service plan that are available for customers. It is easy to change the requirement, and the company will be charged as they have selected. The process needs shorten time for service because customers can customize their needs. In addition, the cost of usage will be shown daily.

Main > SaaS > Select service plan



SQM-ME[®]
Cloud Service Operation

[Add Server](#) [Select Plan](#) [Add Security](#) [Add Alert Tool](#)

[Report on mobile](#) [Report on Web](#) [Online Questions](#) [Help Desk](#)

ADD CLOUD SERVER

City: Thailand Cus: CUTIP

Template: Centos 5.2 (32bit)

Server Description : (Suggest less than 18 characters for better display.)

PLAN			Price per day
Plan A	• 1 CPU	3 Months	฿ 14.69
	• 256 MB RAM	6 Months	
	• 10 GB Hard Disk	12 Months	
Plan B	• 2 CPU	3 Months	฿ 41.15
	• 512 MB RAM	6 Months	
	• 20 GB Hard Disk	12 Months	

Figure 7.22 Selecting Service Plan

Figure 7.23 shows that this system can recharge the balance via credit cards. In addition, a small company can try the system with lower cost, which is different from investment in other software installation. After registering process, users will enter to administration page. There are four main steps of the interface design.

Txn Item	Currency	Amount
Plan C - 4 v. CPU, 1GB RAM, 50GB Storage (c0793768-b755-4611-ae05-84c65413571f)	THB	-9.93
Plan C - 4 v. CPU, 1GB RAM, 50GB Storage (e8fe5dca-b2ff-4513-96cb-f601923945ed)	THB	-0.00
Unpaid Amount	THB	-9.93

Account Details		
Account Balance:	THB	291.47
Unpaid Amount	THB	-9.93
Recharge Amount	THB	10.00
Balance after charged:	THB	291.54

Figure 7.23 Recharge your balance

After selecting the service plan, a customer needs to create the account information. There are four basic steps for creating the user accounts. Firstly, users have to create the usernames and passwords for security reason.

Step (1/4)

1. Account Information
2. Personal/Business Information
3. User Preference
4. Terms and Conditions



Account Type (*) Personal Account Business Account

Display Name (Use for display of user name in web and billing ;)

Login Name (Use for web login;)

Password

Confirm Password

Figure 7.24 Account Information

Step two: users have to fill in the existing email address. The confirmation letter will be sent to this email. In addition, the country need to be specified, thus the time zone will be automatically adjusted.

Step (2/4)

- 1. Account Information
- 2. Personal/Business Information**
- 3. User Preference
- 4. Terms and Conditions



Title	<input checked="" type="radio"/> Mr <input type="radio"/> Mrs <input type="radio"/> Ms	
First Name	<input type="text" value="xxx"/>	
Last Name	<input type="text" value="Chan"/>	
Email Address	<input type="text" value="xxx@email.com"/>	(Enter real mail for account activation)
Confirm Email Address	<input type="text" value="xxx@email.com"/>	
Country	<input type="text" value="Hong Kong"/>	

Figure 7-25 Personal Information

Step three: users have to specify the default language, base currency, default re-charge amount and replenish alert.

Step (3/4)

- 1. Account Information
- 2. Personal Business Information
- 3. User Preference**
- 4. Terms and Conditions



E-Mail Default Language	<input type="text" value="ENGLISH"/>	(The language for e-mail content)
Base Currency	<input type="text" value="US Dollars"/>	(*)
Default Re-charge Amount	<input type="text" value="1.5"/>	(**)
Replenish Alert (%)	<input type="text" value="20"/>	(***)
Replenish Alert (\$)	<input type="text" value="0.3"/>	(****)

Figure 7.26 User Preference

And, finally, term and condition are informed to customers before accessing the system.

Step (4/4)

- 1. Account Information
- 2. Personal Business Information
- 3. User Preference
- 4. Terms and Conditions



Click here to browse Terms and Conditions and Privacy

I have read Terms of Service and Privacy Policy and agree the content

Please enter image code

gggt3d



Refresh

Figure 7.27 Administration Page

7.8 SYSTEM ARCHITECTURE

An architecture description is a formal description of a system. It is organized in a way that supports reasoning about the structural properties of the system. It defines the system components or building blocks and provides a plan from which products can be procured, and systems developed, that will work together to implement the overall system.

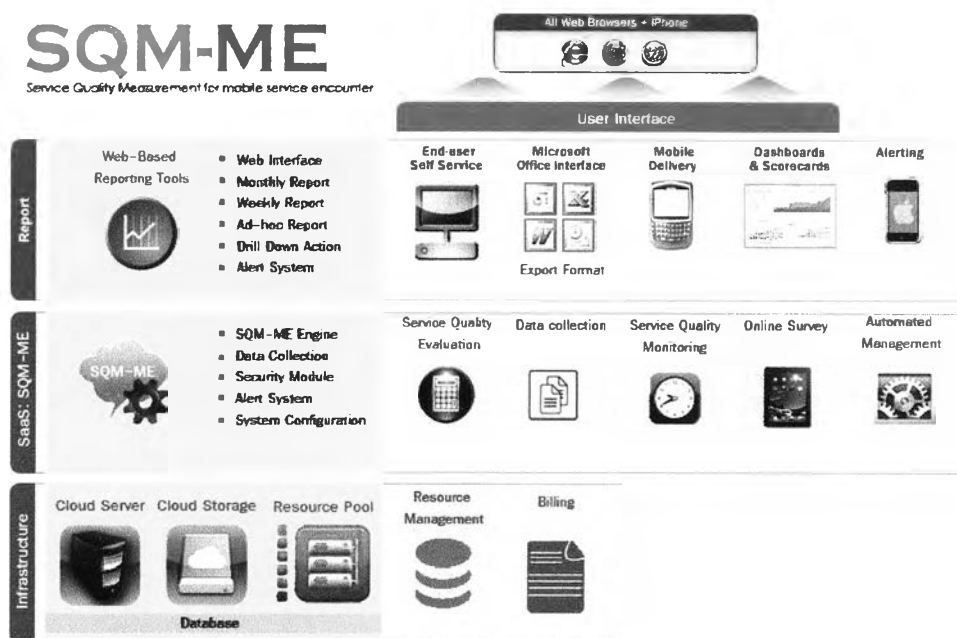


Figure 7.28 System Architecture

When talking about a cloud computing system in SQM-ME architecture, it's helpful to divide it into three sections, which are the infrastructure, SaaS on cloud and the front end reporting system. They connect to each other through a network, usually the Internet. The reporting system is the ?side the computer user, or client, which can be several channels such as websites, iPads and mobile phones. The SaaS section is the core engine of SQM-ME system that calculates the input by SQM-ME engine, the process of data collection and security module. In addition, the alert system will be started when the output is in the specific criteria. The process backend is explained by infrastructure section, which consists of cloud server, cloud storage and resource pool. The users can monitor usage via the management dashboard.

7.9 REPORTING MODULE

Reporting module will present the service quality performance via dashboards, which are designed to deliver maximum visual service quality performance in a format optimized for quick understanding, using a combination of tables, graphics, gauges, dials and other graphical indicators, as well as conditional formatting, free-form labels, borders and background. The input from mobile shop will be collected automatically by the system and delivered via the internet into the cloud database. The numbers of pre-defined KPIs are included in the SQM-ME analytic modules to create various type of report, including SQM-ME score. SQM-ME is designed to successfully achieve these kinds of reports using indicator graphics to quickly illustrate attainment of performance goals, trends over time and status checks. With SQM-ME, service staffs can view their personal contribution to overall service performance through score-cards and dashboards that link individual performance indicators to corporate goals. Managers and executives can also use SQM-ME to create the strategic direction from a high-level to the lower-level view of their subordinates' performance contributions within the organization. The SQ reports can be tailored to specific purposes. In addition, this system is designed to be secure to support any level of user access. The characteristics of reporting module include visualizing key performance data effectively in graph format, easily using dashboard as the background of advance analysis, monitoring the SQ performance real time, delivering the result via email, on a

scheduled or alert basis, securing performance from any web browser and finally, the result can be delivered to mobile phone.

7.10 SERVICE SUPPORT

SaaS is new for Thai market. Consequently, customers need to be educated for this system. Online support is the solution for supporting customers 24 hours a day. The services available on online supports include technical support knowledge on websites, free online training that allows users to access learning database with friendly user interface, free support and training online. As the benefit of cloud computing, the service providers can also solve the problem for customer online. Finally, the professional staff will be assigned to responsible for account overview and regular review of all customer cases.

7.11 SQM-ME System in Mobile service shop

SQM-ME can be easily installed into mobile service shops because the system is located on cloud computing. Figure 7.29 shows the function of mobile service shops after installing SQM-ME system.

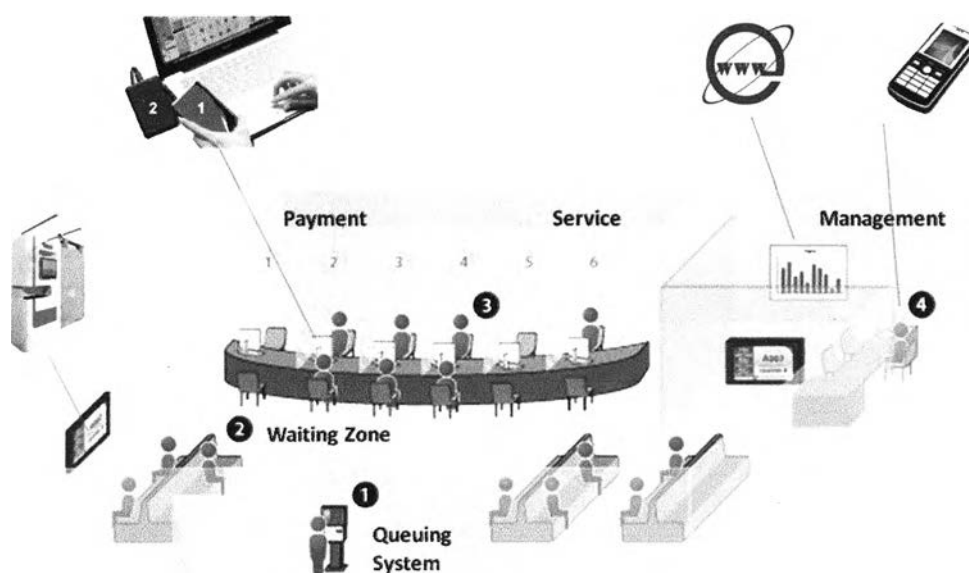


Figure 7.29 Install SQM-ME system into the mobile service shop

7.12 DATABASE DESIGN

The data from mobile telecom shop system will be sent to database. So, the database structure should be designed to fit the data input. Once the relationships and dependencies amongst the various pieces of information have been determined, it is possible to arrange the data into a logical structure which can then be mapped into the storage objects supported by the database management system. In the case of relational databases, the storage objects are tables which store data in rows and columns as shown in table 7.6.

Table 7.6 Service Performance (Sensor 1)

SQ dimension	Indicator Name	Description	Data Input	Data Type
Access	Access Rate	Count of visitors who either a) are serviced at agent stations or b) obtain self-service through in-location computers	Queuing System + SQM-ME	numeric
	Receiving Service	Ratio of visitors receiving agent service to total visitors.	Queuing System + SQM-ME	numeric
Speed of Delivery	Average Waiting Time	The total number of minutes from pulling of service ticket to service.	Queuing System + SQM-ME	numeric
	Waiting Time Achievement	Visitors served within threshold/Total Visitors Serviced.	Queuing System + SQM-ME	numeric
Process Effectiveness	Turn Around Time	The average time to transaction complete expressed as a percentage of target time.	Queuing System + SQM-ME	numeric
Use of Technology	Self-Service Ratio	A visitor to the service office that accesses computers.	Self Service Record	numeric
Reliability	Critical Error Rate	Monitor application/transaction errors requiring additional	Billing Software + Database	numeric

SQ dimension	Indicator Name	Description	Data Input	Data Type
		interactions with clients.		
Channel Effectiveness	Service Demand	Total visitors entering the office.	Queuing system	numeric
	Capacity Ratio	Total Customer/ Total Capacity available	Queuing system	numeric
Agent Utilization	Cost per Contact	Total labor costs divided by total service requests.	Employee Attendant + System Log on	numeric
	Agent Turnover Ratio	A measure of the 'churn' rate within the Agent team.	Employee record	numeric
	Agent Capacity	The anticipated number of hours of agent time available for counter service for each agent.	Employee log on system	numeric
	Resource Allocation	An Indicator for assessing <i>allocated agent positions</i> to service delivery: Total no. of staff/Total no. of customers	Employee log on system	numeric
	Agent Adherence	Calculated as total agent login time divided by scheduled work time.	Employee log on system	numeric
Agent Effectiveness	Total Experience/Serving Time	Average experience/Service Time (Standard Level by Experience Chart)	Queuing + Employee record	numeric
	Agent Coaching Ratio	Number of hours of 1 on 1 coaching time/agent.	Queuing + Employee record	numeric
	Training Days/Agent	Total training days delivered during the measurement period divided by the number of agents.	Employee record + Training record	numeric

Table 7.7 Service Perception (SENSOR 2)

SQ dimension	Indicator Name	Description	Measuring Method	Data Type
Flexibility	Process Flexibility	The processes of service delivery are flexible with reasonable situation.	SQM-ME: Online Survey Module	Likert Scale 1-7
Perception of Queuing Process	Queuing Fairness	Queuing Process in mobile shop is designed with fairness and clearly communicate.	SQM-ME: Online Survey Module	Likert Scale 1-7
	Queuing Design	Queuing Process in mobile shop is well designed with effectiveness.	SQM-ME: Online Survey Module	Likert Scale 1-7
Perception on Shop Environment	Ambiance Condition	The physical facilities at excellent shops will be visually appealing and modern looking equipment.	SQM-ME: Online Survey Module	Likert Scale 1-7
	Material & Document	Materials associated with the service (pamphlets, form or statements) will be clearly designed for ease of understanding.	SQM-ME: Online Survey Module	Likert Scale 1-7
	Sign/Symbol	Sign/Symbol will be clearly signed and designed for ease of understanding and visually appealing at an excellent mobile shop.	SQM-ME: Online Survey Module	Likert Scale 1-7
	Location	Mobile shop is located in the place that easy to access.	SQM-ME: Online Survey Module	Likert Scale 1-7
	IT System	The availability of IT system with accuracy and effectiveness.	SQM-ME: Online Survey Module	Likert Scale 1-7
	Cleanliness	Mobile shop is clean and tidy.	SQM-ME: Online Survey Module	Likert Scale 1-7
	Sufficient Staff	The organization should ensure that the key processes have a clearly	SQM-ME: Online Survey Module	Likert Scale 1-7

SQ dimension	Indicator Name	Description	Measuring Method	Data Type
		defined process owner(s) and containing enough resource(s).		
	Employee Appearance	Employees at excellent shop will be neat in their appearance.	SQM-ME: Online Survey Module	Likert Scale 1-7
Competence (Assurance)	Product/Service Knowledge	Agents of excellent shops will have the knowledge to answer customers' questions	SQM-ME: Online Survey Module	Likert Scale 1-7
	Problem Solving	The organization should ensure that service providers are able to solve the urgent situations/problems.	SQM-ME: Online Survey Module	Likert Scale 1-7
	Communication Skill	The organization should ensure all relevant product/service related information is clearly communicated by service providers.	SQM-ME: Online Survey Module	Likert Scale 1-7
	Emotional Control	The organization should ensure that service providers are able to control their emotions in all situations.	SQM-ME: Online Survey Module	Likert Scale 1-7
Responsiveness	Responsiveness	Agents of excellent shops will give prompt service to customers and never be too busy to respond to customers' requests.	SQM-ME: Online Survey Module	Likert Scale 1-7
Empathy	Empathy	Agents will always be willing to help customers.	SQM-ME: Online Survey Module	Likert Scale 1-7
Reliability	Reliability	The ability to perform the promised service dependably and accurately.	SQM-ME: Online Survey Module	Likert Scale 1-7

Table 7.8 SQ Output

SQ dimension	Indicator Name	Description	Measuring Method	Data Type
Physical Result (Tangible)	No. of completed task/total transaction	% of Completion	Billing System, and CS System	Numeric
Customer Experience (Intangible)	Customer Satisfaction Level	Overall satisfaction scoring	SQM-ME: Online Survey Module	Likert Scale 1-7
	Service Compliant	Total service complaints received during reporting period.	SQM-ME: Online Survey Module	Likert Scale 1-7

Table 7.9 Self Assessment

SQM dimensions	Influencer Dimension	Description	Measuring Method	Data Type
Policy	Policy communication	The leaders of the organization shall ensure that all employees receive regular communication regarding policies, processes, products/services and related changes which are relevant to their job.	Internal Auditor Evaluation	100 Point
	Quality Standard Policy	The organization shall have in place defined and published customer service standards for all customer delivery channels which are communicated to all stakeholders.	Internal Auditor Evaluation	100 Point
	HR Training Policy	The organization should develop and document HR, Development and Training Policies which should specify clear courses of action for recruitment, selection, appraisal and employee grievance, together with	Internal Auditor Evaluation	100 Point

SQM dimensions	Influencer Dimension	Description	Measuring Method	Data Type
		career development plans and a reward and recognition programs.		
	Service Quality Improvement Policy	The organization shall develop and document continuous improvement policies which detail its commitment to continuous customer experience improvement through leadership, customer research and performance measurement.	Internal Auditor Evaluation	100 Point
	Process Planning	The organization shall develop and document the key processes which have been identified as essential to service delivery.	Internal Auditor Evaluation	100 Point
Personal Moderator	Personality	The organization shall prepare the <i>personality test for service providers</i> .	Internal Auditor Evaluation	100 Point
	Motivation	The leaders of the organization should ensure that a suitable Reward and Recognition Program for all employees is implemented with clearly communicated guidelines.	Internal Auditor Evaluation	100 Point
	Training	The leaders of the organization should ensure that employee received enough training relevant to their job and the training records (particularly training and performance records) are retained and kept up to date.	Internal Auditor Evaluation	100 Point
	Experience	The organization contains sufficient experienced staffs in mobile shop.	Internal Auditor Evaluation	100 Point
Shop	Ambiance Condition	The organization should develop and monitor ambiance condition.	Internal Auditor Evaluation	100 Point

SQM dimensions	Influencer Dimension	Description	Measuring Method	Data Type
	Facility	Facility and equipments are all in good condition.	Internal Auditor Evaluation	100 Point
	Sign/Symbol	The organization should be aware of sign/symbol and advertising within shops.	Internal Auditor Evaluation	100 Point
	Information Technology	The organization should ensure that information system is in place. The organization should ensure that the system contains up to date information regarding products/services at all times.	Internal Auditor Evaluation	100 Point
	Cleanliness	The organization should ensure that shop is clean compared with standard level.	Internal Auditor Evaluation	100 Point
	Sufficient Staff	The organization should provide sufficient staffs compared with the volume of customers.	Internal Auditor Evaluation	100 Point
Customer Dimension	Customer Segmentation	The organization should have an in depth understanding of their current and potential customers which is used to identify their needs and expectations.	Internal Auditor Evaluation	100 Point
	Competitors/Alternatives	The organization should regularly <i>conduct competitor analysis and</i> clearly identify the quality/performance of competing products/services.	Internal Auditor Evaluation	100 Point
	Customer Feedback system	Customer Complaints/Comments/Suggestions and Feedback are collected and responded to in a timely pre-defined manner, with results communicated to all employees. The organization shall ensure that the information collected is used to improve product/service delivery.	Internal Auditor Evaluation	100 Point

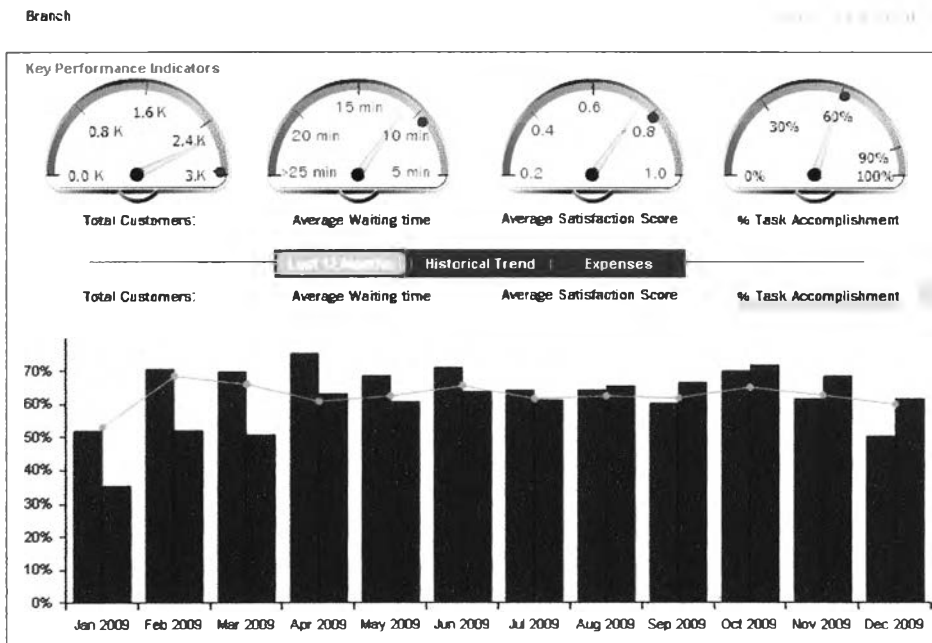


Figure 7.31 Service Quality Management Dashboards

Figure 7.31 shows staff occupancy level. One factor that has a major impact on mobile service shop staffing is the size of the customers who enter a mobile shop compared with the number of the agent groups. Agents handling larger volumes of customer's entry will naturally be more efficient than smaller ones. This is due to the economies of scale of large groups. However, managers will be able to plan for the suitable number of staffs compared with the history

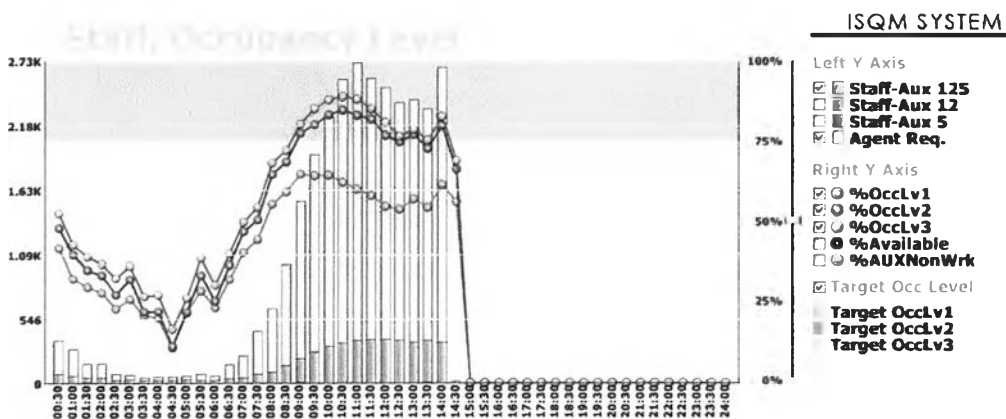


Figure 7.32 Staff Occupancy Level

The data from queuing system will be collected into the database. SQM-ME system will analyze and present the number of customer traffic comparing to the past data. The

system is able to forecast the number of customer traffic, thus the manager can proactively handle the situation.

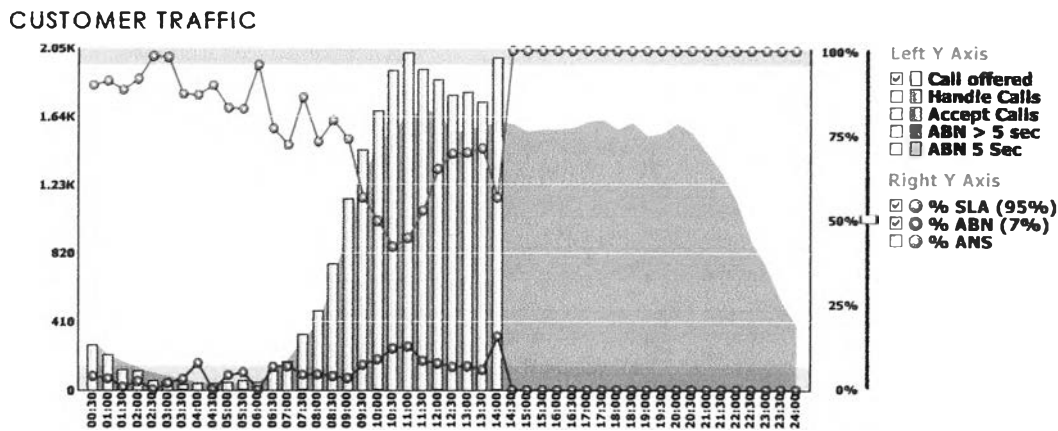


Figure 7.33 Customer Traffic

Figure 7.34 shows the service delivery period, which is the duration since customers call for the service until finishing service delivery process. Service delivery period can also be compared with past history.

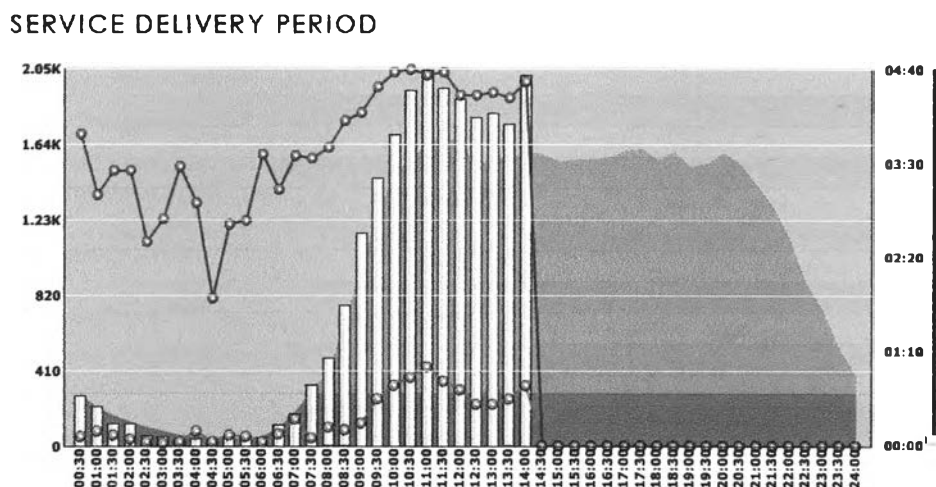


Figure 7.34 Service Delivery Period

7.14 REPORTING VIA MOBILE PHONE

Smartphone or mobile computing is reaching a tipping point that is going to have an intense effect on how people access and work with information everywhere every time. SQM-ME is located on cloud computing, so the system can access via websites. Consequently, all reporting systems can be accessed by using a mobile phone to access the internet. The benefit of mobile access includes speeding up executive decision making, improving daily customer services, increasing operational productivity and streamlines service delivery processes, and mitigating risks in mobile service shops management.



Figure 7.35 Reporting system on mobile phone

7.15 SMS Alert Design

SQM-ME system can send alerts if the data meet the pre-defined criteria while processing processes or in the background processing for a service delivery process chain. Process chain maintenance uses alert management for this purpose. The alert is sent to the users who schedule the process chain. The users can assign additional recipients by assigning roles or specifying individual users in alert category maintenance.

If users have set the indicator in service quality attribute maintenance for the process chain, an alert is sent by default for each process that has met the criteria.

Before the system can trigger and send alerts, alert categories have to be assigned to the person who is responsible for the process, or process owner. The recipient, texts, priorities, escalation options, and so on can be determined in an alert category. The system determines the alert category. For example:

Criteria: If the average waiting time exceeds 15 min, the SMS alert will be triggered and send alerts to managers. In addition, end users can personalize their alert notifications, for example, create notification variants or determine a substitute.

The following picture shows the components that participate in the generation and delivery of an alert.

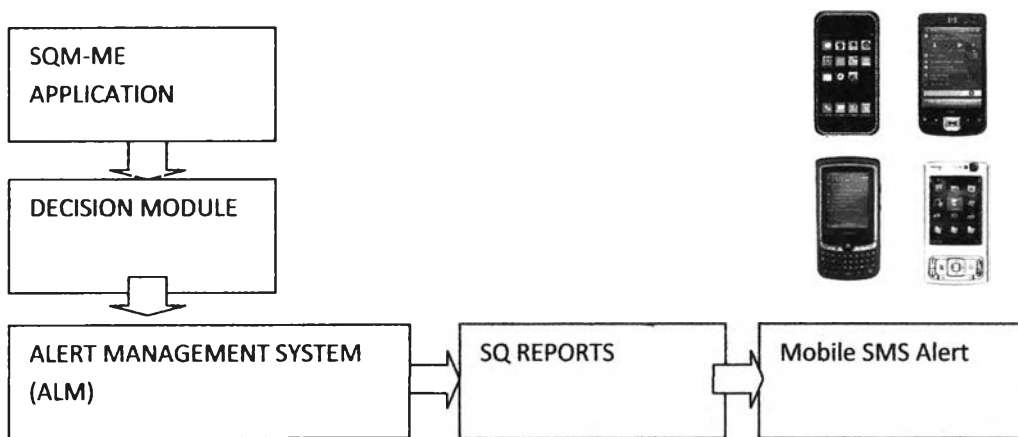


Figure 7.36 SMS Alert Process

First, a situation arises in an application. An SQM-ME decision tool decides whether or not an alert has to be triggered. If the decision tool comes to the conclusion that an alert has to be triggered, the triggered alert is pushed to ALM. ALM takes care of the correct and timely alert delivery to the display programs via SMS.

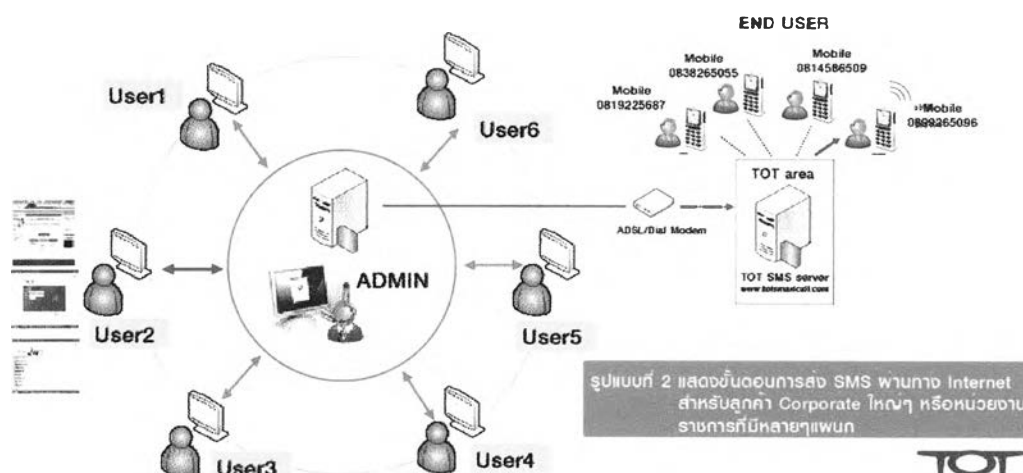


Figure 7.37 the Connect of SQM Alert System to SMS Service Provider

In the real case, SQM-ME system will be connected to mobile service operation that can support the SMS alert system. As seen in figure 7.37, all users send data to the database on cloud computing. If the data fit to the criteria, the SMS alert will be triggered by sending the signal via network to SMS service of mobile operators, then SMS will be delivered to end users.

7.15.1 Pilot test of SMS Alert

In order to test the system, the designed system comprises of 2 scenarios, which are (1) pilot model, and (2) corporate model. For the pilot model, the data from multi-terminal will be sent as the input to LAN system via queue management server. The mobile air card from personal computer will automatically send SMS to mobile service operator and redirect to mobile phone users. However, this pilot model needs a mobile phone to plug in to the single computer to simulate the SMS sender system.

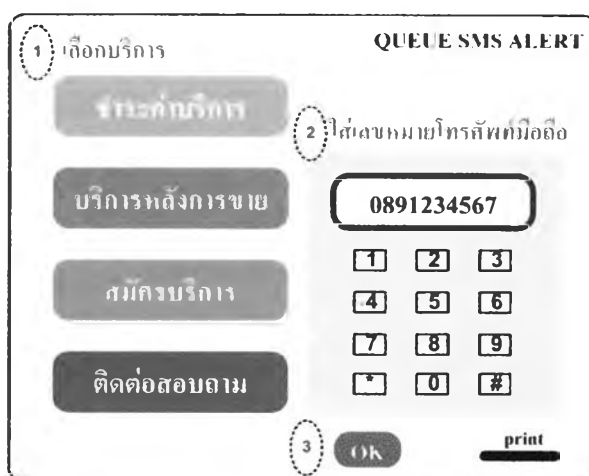


Figure 7.37 the feature of queuing screen

Figure 7.37 shows the detail of queuing screen monitor. There are four main service types, which are bill payment, after-sale service, product registration, and information request. A customer has to fill in the telephone number, and then this mobile number will be linked to the online questionnaire.

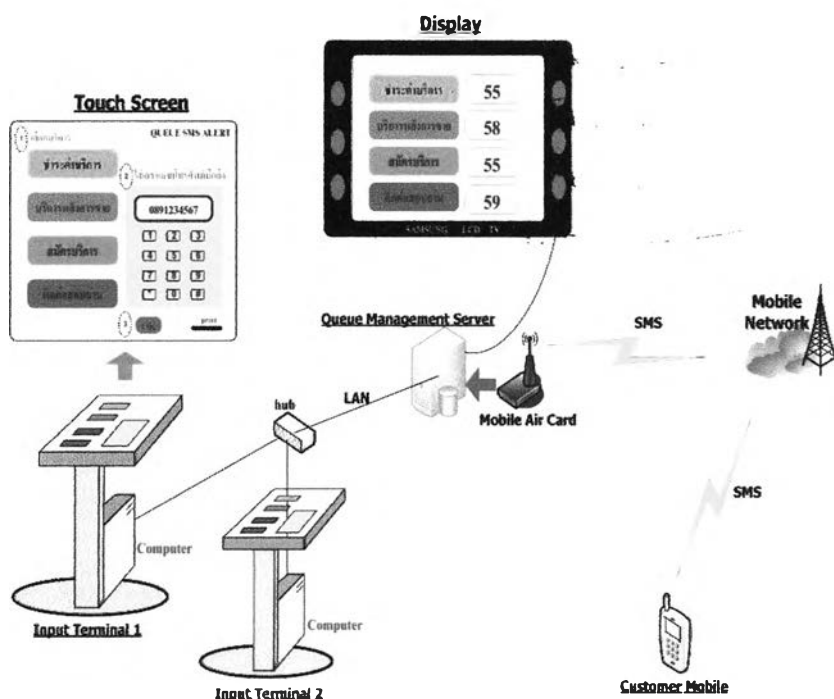


Figure 7.38 the Feature of SMS Pilot Model

The SMS alert is tested by simulating the SQM-ME system with two computers, which are connected with LAN hub. The data will be delivered by mobile air card and SMS is sent to mobile network and then it is redirected to a customer's mobile.

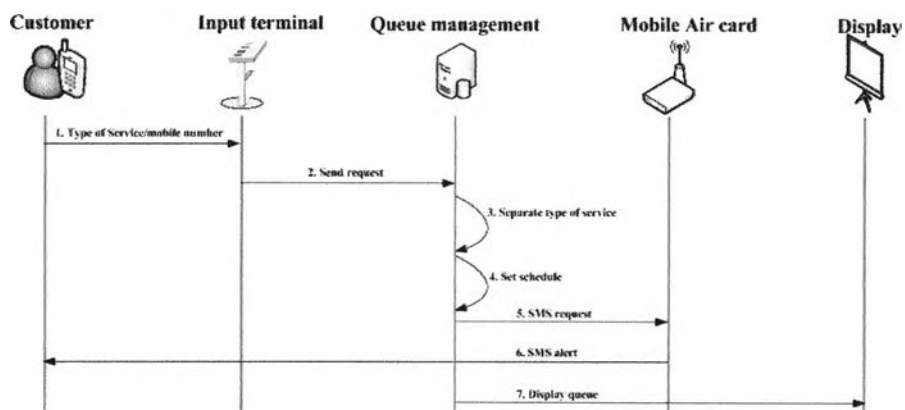


Figure 7.39 Process Swim lanes for Pilot Model

Figure 7.39 shows the concept of SMS alert that customers who access the terminal will enter the mobile numbers and select the services. Data from terminal will be sent to queue management. The data such as waiting time, number of queue and total number of customers will be collected in the database. SQM ME System analyzes the result from database and sends SMS alert in case the result is in the inclusion criteria for SMS alert. The display screen will be shown in websites, emails and mobile phones.

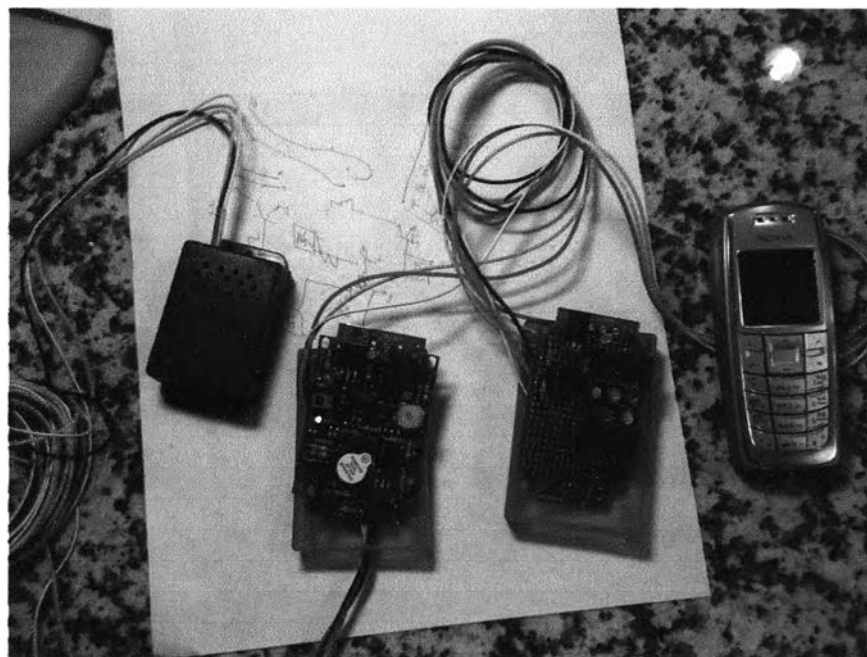


Figure 7.40 Picture of Pilot Test

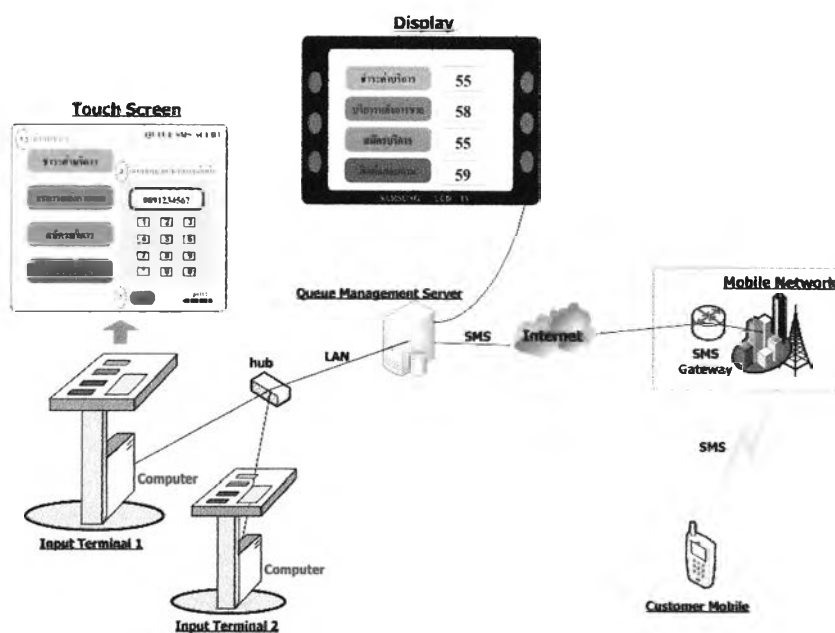


Figure 7.41 Corporate Model

Figure 7.41 shows that the system in the real case can send the signal via cloud computing system. Triggered SMS will be sent via the internet to mobile network and forward directly to a user's mobile phone.

7.16 ONLINE SURVEY DESIGN

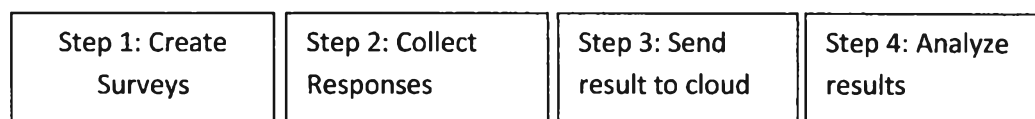


Figure 7.42 Online Survey Design

Step 1: Create Surveys; using just their browsers, users can easily create the most complex surveys. This module will help users design service quality surveys with the easy to use survey editor. The survey offers 42 questions from SQM-ME model and the possibility to add more specific questions to customer's surveys.

Step 2: Collect Responses: Collect responses by asking customers to fill in a questionnaire via a device in the mobile shop after finishing the service, or sending email

invitations or by placing a link to the survey on any websites. SQM-ME also offers a powerful mailing system that will help customers send and track email invitations to their surveys.

Step3: Send data to cloud: The input devices are already connected to the internet, so the result of the online survey can be sent to the database on cloud server. In addition, SQM analysis module is also located on cloud; the result can be calculated real time and go to the analysis logic design.

Step 4: Analyze Results: Customers can view the results as they are collected in real-time using SQM-ME reports. Customers can use reports to summarize and analyze the responses. Dig down to a specific answer. Export their data if they want to process it offline using tools like Excel or SPSS.



Figure 7.43 Online Survey Devices

7.17 SQM-ME DETAIL SUMMARY

SQM-ME systems need to deliver the right information of mobile service shops to the right users at the right time. Since the source information can potentially come from many different and nonintegrated sources, data has to be processed in SQM-ME on cloud computing before it is effectively delivered to the end users. There are many data flows existing in any business intelligence system. The variety of SQM-ME design system is shown in figure 7.44:

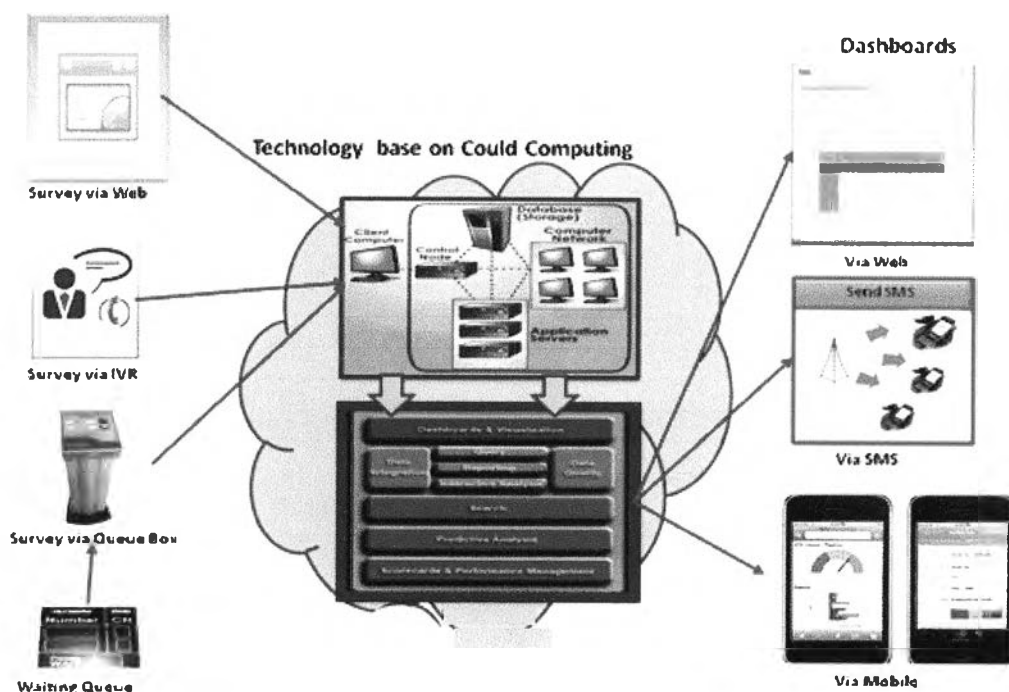


Figure 7.44 SQM-ME System Summary

The source information can potentially come from many different and nonintegrated sources including queuing system, survey via online module, customer service system and customer rating score. Significant analytical tool development of SQM-ME will be required to support mission design, development, and operations along with identification and implementation of analytical standards on cloud server. The output of the system is shown in three main channels, which are a dashboard via website, an SMS alert and an SQ performance report via mobile phone.

7.18 TESTING PHASE

In the testing phase, the proposed SQM-ME system was tested in a workshop held at True Corporation. The objective of the workshop was to test the feasibility of the SQM-ME in management practice. The author acted as a facilitator to guide and structure the process. The facilitator limited the guidance and provided only the concept of SQM-ME system. The facilitator did not attempt to influence the workshop. The workshop spent

around three hours by separating 20 people into four groups. The feedback obtained from the assessment was discussed at the end of the workshop. The results show that 15 participants decide to purchase the SQM-ME system, if this system is available in the market. 5 participants deny to purchase but provide some valuable improvement opportunity for this system. After the discussion, consensus agreement on the relative weight of innovation assessment was summarized in Table 7.10.

Table 7.10 Software Application Testing

Attributes/Characteristics	Maximum Possible	Score	Description
A. Functionality, scalability, and adaptability, emphasizing client interaction (Software Applications only)	5	4.2	Software Applications designed to fulfill business requirements and maximize the efficiency and effectiveness of business functions with the ability to scale and adapt as business requirements change.
B. Platform independence and use of cloud computing technologies	5	4.6	Cloud computing platform enable users to use with easy implementation, programming languages, middleware, development tools, databases, utilities, etc.
C. Exchange of information, integration with other software	5	4.7	Utilizes common, standard interfaces and/or middleware having the ability to interoperate and integrate with other software without requiring custom programming or intermediate, interface-specific applications.
D. Ability to maximize (take full advantage of) Target Network, Security, and Platform Architectures	5	4.1	Has the capability to conform to, and adhere to, the standards and best practices delineated in the other domain architectures without requiring substantial modifications.
Total Rating Points	20	17.6	

The result from product testing session shows that the rating score is 17.6, which is considerably high. The average score in all dimensions is more than 4.0. It means that the 20 users are satisfying with the design functions.